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OIL WORLD
and Petroleum Industry

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Vol. 35
No. 15
Whole
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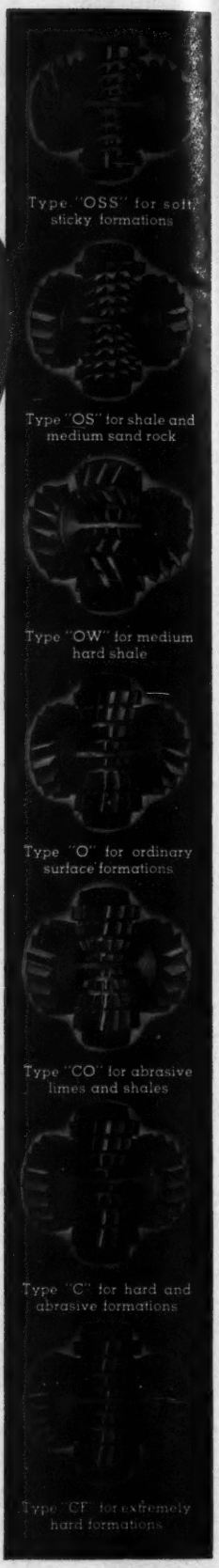
Type "OSS" for soft, sticky formations
Type "OS" for shale and medium sand rock
Type "OW" for medium hard shale
Type "O" for ordinary surface formations
Type "CO" for abrasive limes and shales
Type "C" for hard and abrasive formations
Type "CF" for extremely hard formations

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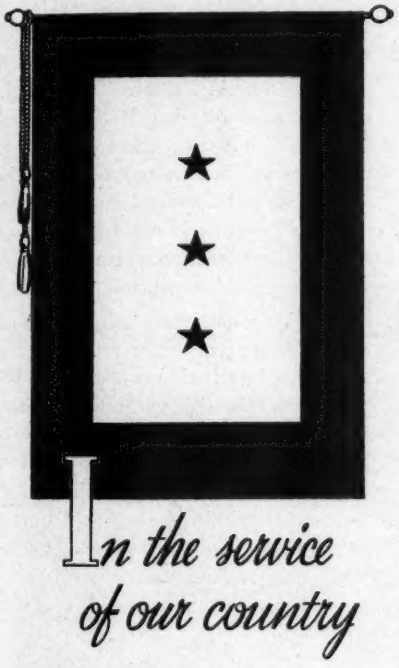
CALIFORNIA
OIL WORLD
and Petroleum Industry

PUBLISHED TWICE A MONTH — ENGINEERING — TECHNOLOGY — LATEST NEWS

FIRST ISSUE
AUGUST 1942
VOL. 35 NO. 15
WHOLE NO. 1614

IN THIS ISSUE



Measurement and Control in the Natural Gasoline Plant 4

Powerful Pumping Unit Made of Wood 16

Laugh This Off 18

Los Angeles Basin Development 19

San Joaquin Valley Development 23

Coastal District Development 26

Nomads Hold Third Annual Wing-Ding 27-28-29

Business Directory 30

PETROLEUM PUBLISHERS, INC. 939 SO. BROADWAY BLDG.
LOS ANGELES, CALIFORNIA-MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

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California Oil World and Petroleum Industry is published twice a month at 1009 in the 939 So. Broadway Bldg., Los Angeles, California. Entered as Second-class Matter January 1, 1937, at the post office at Los Angeles, California, under the Act of March 3, 1879. Subscription price $1 per year in U. S. and Possessions, $2 in foreign countries, including Canada. Member of the Audit Bureau of Circulations.

August 11, 1942

Telephone Number TUcker 2571

Measurement and Control in the Natural Gasoline Plant

By

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General Petroleum Corp. of Calif.*

*Presented Before CNGA Meeting
July 2, 1942
Rio Hondo Golf Club

There are many basic factors upon which the design and operation of the Natural Gasoline Plant must depend. Some of these are modified by existing economic and local conditions and much of the theory behind the design must be practically tested and confirmed. In the measurement and control of the various fluids with which the plants are operated, these basic factors are continuously being tried and developed. In presenting this paper therefore, it is the hope of the Southern California Meter Association and author, that some practical helpful information may be given for the construction of new Natural Gasoline Plants as well as for the better operation of those now in service.

Since Natural Gasoline Plants are designed and operated for the production of various petroleum fractions at a profit to the owner, it is self evident that, the installation of any machinery, meters, regulators, or control equipment that is not definitely necessary to the efficient and economical operation of the plant, constitutes a poor investment. Moreover, simplicity of design provides for better and more easily maintained plant control. It is a design axiom therefore, that to hold the capital and maintenance expense to a minimum, no meter or regulator should be provided except where they serve a necessary purpose. The following discussion will perhaps serve to indicate the necessary locations of meters and control equipment within the gasoline plant and the reasons for each installation.

General Factors to Consider

To begin with, there are different standards of measurement and regulation which should be set up for each phase of the plant operation. Orifice meters which are involved in the measurement of lessors gas for royalty settlement, or for determination of plant balances should conform to existing code standards as shown in Figures No. Ia, Ib, Ic and Id. As suggested by Frank West of the Texas Company in a paper before the S.C.M.A. in 1939, these could be termed "code" meters. In contrast to this, the "non-code" meters might be used for plant control and measurements of a less vital nature, where an accuracy of within 1% or 2% was sufficient. On "non-code" orifice meters for instance, the length of the meter tubes might be shortened and standard pipe and flanges used without particular regard for tolerances.

Similarly, there are certain standards of temperature and pressure which must be maintained within the plant if maximum yield and uniformity of product are to be maintained. The quality of certain plant products depends upon the accurate control within tenths of a degree F. of the process temperature, whereas other phases of the process may be allowed greater variance. These standards and the controls necessary to maintain them will be indicated as each section of the plant is discussed.

There are several general recommendations which will apply to all meters and control equipment throughout the plant. The first of these is in regard to orifice meters and should be particularly stressed, both from a standpoint of accurate measurement and for proper maintenance of equipment. It is the regular periodic inspection of orifice meter plates and checking of meter gages. While no time limit can be set for all types of meter service, it is felt that all meters and plates should be checked at least every 90 days and most locations oftener. By making these regular inspections, any deviation of the plates from standard dimensions due to abrasive or corrosion action can be detected. It also enables the meterman to keep the gage in proper working order, so the major repairs are cut to the minimum.

If the orifice meter plates are to be regularly inspected it will be necessary for provisions to be made for the removal of the plate without shutting the line down, since this is seldom practicable in the Natural Gasoline Plant. This means the installation of a by pass around the meter run or the use of an orifice fitting which will permit removal of the plate while the line is in service. It has been the general experience of the industry that the price of either of these two alternatives is comparable, so from a standpoint of space conservation it is generally recommended that orifice fittings be used.

Figure Ie illustrates the specifications for orifice meter plates as given in the C.N.G.A. bulletin T.S.-353. It will be noted that bevel edge orifices are required in many cases in order to conform to these standards for the measurement of natural gas. In general, the beveling is not found necessary for the measurement of the various plant liquids or steam.

An occasional source of error in an otherwise perfect meter set-up, is the improper installation of gaskets between the tube flanges and the orifice fitting. The joint when properly gasketted should present a smooth inner surface, since any projection of the gasket within the inner diameter of the bore invalidates all the careful machining and alignment which have been done to maintain fixed orifice conditions.

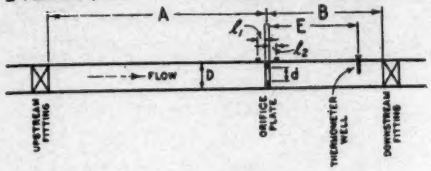
It will be desired at times that samples may be obtained of the fluids flowing through the meter runs so that specific gravity determination or other tests may be made upon them. For this purpose a center line sampling tap should be installed at the downstream end of the meter run to enable a representative sample of the fluid to be drawn off. Just downstream of this connection a thermometer well of the correct size should be installed to obtain information for the temperature correction factor in the meter coeffi-

FIG. 1a.

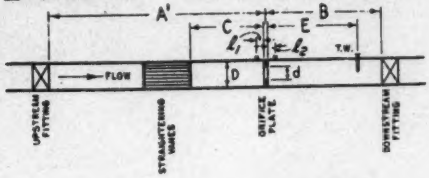
MINIMUM STRAIGHT LENGTHS OF STANDARD SIZED METER TUBES FOR VARIOUS TYPES OF UPSTREAM & DOWNSTREAM PIPE LINE FITTINGS

REFERENCE: 1935 U.S. BUREAU OF STANDARDS & AMERICAN GAS ASSOCIATION SPECIFICATIONS

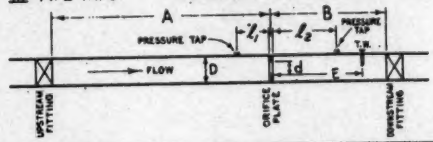
I FLANGE TAPS — NO STRAIGHTENING VANES USED



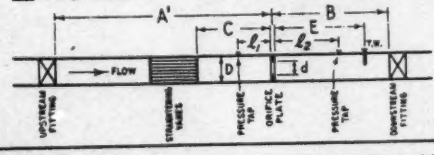
II FLANGE TAPS — STRAIGHTENING VANES USED



III PIPE TAPS — NO STRAIGHTENING VANES USED



IV PIPE TAPS — STRAIGHTENING VANES USED



	INTERNAL PIPE DIA "D" IN INCHES	LOCATION OF PRESSURE TAPS		LOCATION OF THERMOMETER WELL E (MINIMUM)	TYPE OF PIPE LINE FITTING EITHER UPSTREAM OR DOWNSTREAM FROM ORIFICE														
					CASE 1 SWEDGE EITHER INCREASING OR DECREASING			CASE 2 ONE BEND			CASE 3 TWO BENDS IN SAME PLANE			CASE 4 TWO BENDS NOT IN SAME PLANE			CASE 5 REGULATOR CONTROL VALVE, ETC.		
		l_1	l_2	3D+1"	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
I FLANGE TAPS NO STRAIGHTENING VANES USED	2.067	1.00"	1.00"	0'8"	2'4"	0'10"		2'11"	0'10"		3'9"	0'10"		5'11"	0'10"		7'8"	0'10"	
	3.068	"	"	0'11"	3'6"	1'2"		4'3"	1'2"		5'7"	1'2"		8'9"	1'2"		11'5"	1'3"	
	4.026	"	"	1'2"	4'7"	1'7"		5'7"	1'7"		7'4"	1'7"		11'6"	1'7"		15'0"	1'7"	
	6.065	"	"	1'8"	6'10"	2'4"		8'5"	2'4"		11'0"	2'4"		17'4"	2'4"		22'6"	2'5"	
	8.071	"	"	2'2"	9'1"	3'1"		11'2"	3'1"		14'8"	3'1"		23'1"	3'1"		30'0"	3'2"	
	10.19	"	"	2'8"	11'6"	3'10"		14'1"	3'10"		18'6"	3'10"		29'1"	3'10"		37'10"	4'0"	
Maximum Ratio (d/D) = 0.75	12.09	"	"	3'2"	13'8"	4'7"		16'8"	4'7"		21'11"	4'7"		34'6"	4'7"		44'11"	4'9"	
	15.25	"	"	3'11"	17'2"	5'9"		21'0"	5'9"		27'7"	5'9"		43'6"	5'9"		56'7"	6'0"	
	19.182	"	"	4'11"	21'7"	7'3"		26'5"	7'3"		34'9"	7'3"		54'9"	7'3"		71'2"	7'7"	

	D	l_1	l_2	E	A'	B	C	A'	B	C	A'	B	C	A'	B	C	A'	B	C
				3D+1"	15.5 D	4.5 D	7.2 D	16.5 D	4.5 D	7.2 D	13.7 D	4.5 D	7.2 D	14.4 D	4.5 D	7.2 D	17.0 D	4.7 D	7.2 D
II FLANGE TAPS STRAIGHTENING VANES USED	2.067	1.00"	1.00"	0'8"	2'9"	0'10"	1'3"	2'11"	0'10"	1'3"	2'5"	0'10"	1'3"	2'6"	0'10"	1'3"	3'0"	0'10"	1'3"
	3.068	"	"	0'11"	4'0"	1'2"	1'11"	4'3"	1'2"	1'11"	3'7"	1'2"	1'11"	3'9"	1'2"	1'11"	4'5"	1'3"	1'11"
	4.026	"	"	1'2"	5'3"	1'7"	2'5"	5'7"	1'7"	2'5"	4'8"	1'7"	2'5"	4'10"	1'7"	2'5"	5'9"	1'7"	2'5"
	6.065	"	"	1'8"	7'11"	2'4"	3'8"	8'5"	2'4"	3'8"	7'0"	2'4"	3'8"	7'4"	2'4"	3'8"	8'8"	2'5"	3'8"
	8.071	"	"	2'2"	10'6"	3'1"	4'11"	11'2"	3'1"	4'11"	9'3"	3'1"	4'11"	9'9"	3'1"	4'11"	11'6"	3'2"	4'11"
Maximum Ratio (d/D) = 0.75	10.19	"	"	2'8"	13'2"	3'10"	6'2"	14'1"	3'10"	6'2"	11'8"	3'10"	6'2"	12'3"	3'10"	6'2"	14'6"	4'0"	6'2"
	12.09	"	"	3'2"	15'8"	4'7"	7'4"	16'8"	4'7"	7'4"	13'10"	4'7"	7'4"	14'7"	4'7"	7'4"	17'2"	4'9"	7'4"
	15.25	"	"	3'11"	19'9"	5'9"	9'2"	21'0"	5'9"	9'2"	17'5"	5'9"	9'2"	18'4"	5'9"	9'2"	21'8"	6'0"	9'2"
	19.182	"	"	4'11"	24'10"	7'3"	11'7"	26'5"	7'3"	11'7"	21'11"	7'3"	11'7"	23'1"	7'3"	11'7"	27'3"	7'7"	11'7"

	D	l_1	l_2	E	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
		2.50 D	8.00 D	11.0 D	14.2 D	12.3 D		15.7 D	12.3 D		20.5 D	12.3 D		32.8 D	12.3 D		40.4 D	12.3 D	
III PIPE TAPS NO STRAIGHTENING VANES USED	2.067	0'5.17"	1'4.54"	1'11"	2'6"	2'2"		2'9"	2'2"		3'7"	2'2"		5'8"	2'2"		7'0"	2'2"	
	3.068	0'7.67"	2'0.54"	2'10"	3'8"	3'2"		4'1"	3'2"		5'3"	3'2"		8'5"	3'2"		10'4"	3'2"	
	4.026	0'10.07"	2'8.21"	3'9"	4'10"	4'2"		5'4"	4'2"		6'11"	4'2"		11'1"	4'2"		13'7"	4'2"	
	6.065	1'3.16"	4'0.52"	5'7"	7'3"	6'3"		8'0"	6'3"		10'5"	6'3"		16'7"	6'3"		20'6"	6'3"	
	8.071	1'8.18"	5'4.57"	7'5"	9'7"	8'4"		10'7"	8'4"		13'10"	8'4"		22'1"	8'4"		27'3"	8'4"	
Maximum Ratio (d/D) = 0.70	10.19	2'1.48"	6'9.52"	9'5"	12'1"	10'6"		13'4"	10'6"		17'5"	10'6"		27'11"	10'6"		34'4"	10'6"	
	12.09	2'6.23"	8'0.72"	11'1"	14'4"	12'5"		15'10"	12'5"		20'8"	12'5"		33'1"	12'5"		40'9"	12'5"	
	15.25	3'2.13"	10'2.00"	14'0"	18'1"	15'8"		20'0"	15'8"		26'1"	15'8"		41'9"	15'8"		51'5"	15'8"	
	19.182	3'11.96"	12'9.46"	17'8"	22'9"	19'8"		25'2"	19'8"		32'10"	19'8"		52'6"	19'8"		64'7"	19'8"	

	D	l_1	l_2	E	A'	B	C	A'	B	C	A'	B	C	A'	B	C	A'	B	C
		2.50 D	8.0 D	11.0 D	16.2 D	12.3 D	8.7 D	15.7 D	12.3 D	8.7 D	14.2 D	12.3 D	8.7 D	15.0 D	12.3 D	8.7 D	17.0 D	12.3 D	8.7 D
IV PIPE TAPS STRAIGHTENING VANES USED	2.067	0'5.17"	1'4.54"	1'11"	2'10"	2'2"	1'6"	2'9"	2'2"	1'6"	2'6"	2'2"	1'6"	2'7"	2'2"	1'6"	3'0"	2'2"	1'6"
	3.068	0'7.67"	2'0.54"	2'10"	4'2"	3'2"	2'3"	4'1"	3'2"	2'3"	3'8"	3'2"	2'3"	3'11"	3'2"	2'3"	4'5"	3'2"	2'3"
	4.026	0'10.07"	2'8.21"	3'9"	5'6"	4'2"	3'0"	5'4"	4'2"	3'0"	4'10"	4'2"	3'0"	5'1"	4'2"	3'0"	5'9"	4'2"	3'0"
	6.065	1'3.16"	4'0.52"	5'7"	8'3"	6'3"	4'5"	8'0"	6'3"	4'5"	7'3"	6'3"	4'5"	7'7"	6'3"	4'5"	8'8"	6'3"	4'5"
	8.071	1'8.18"	5'4.57"	7'5"	10'11"	8'4"	5'11"	10'7"	8'4"	5'11"	9'7"	8'4"	5'11"	10'2"	8'4"	5'11"	11'6"	8'4"	5'11"
Maximum Ratio (d/D) = 0.70	10.19	2'1.48"	6'9.52"	9'5"	13'10"	10'6"	7'5"	13'4"	10'6"	7'5"	12'1"	10'6"	7'5"	12'9"	10'6"	7'5"	14'6"	10'6"	7'5"
	12.09	2'6.23"	8'0.72"	11'1"	16'4"	12'5"	8'10"	15'10"	12'5"	8'10"	14'4"	12'5"	8'10"	15'2"	12'5"	8'10"	17'2"	12'5"	8'10"
	15.25	3'2.13"	10'2.00"	14'0"	20'6"	15'8"	11'1"	20'0"	15'8"	11'1"	18'1"	15'8"	11'1"	19'1"	15'8"	11'1"	21'8"	15'8"	11'1"
	19.182	3'11.96"	12'9.46"	17'8"	25'11"	19'8"	13'11"	25'2"	19'8"	13'11"	22'9"	19'8"	13'11"	24'0"	19'8"	13'11"	27'3"	19'8"	13'11"

NOTE: l_1 is measured from the center of upstream tap to the upstream face of orifice plate.
l_2 is measured from the center of downstream tap to the downstream face of orifice plate.

Where a control valve, regulator, etc. exists upstream from the orifice and the pipe line between the fitting and the orifice is not straight the total length of irregular pipe as specified for straight pipe in Case 5 will be ample. In this case the length of straight pipe directly upstream from the orifice will then be determined by the type of pipe fitting or flow conditions just prior to the orifice.

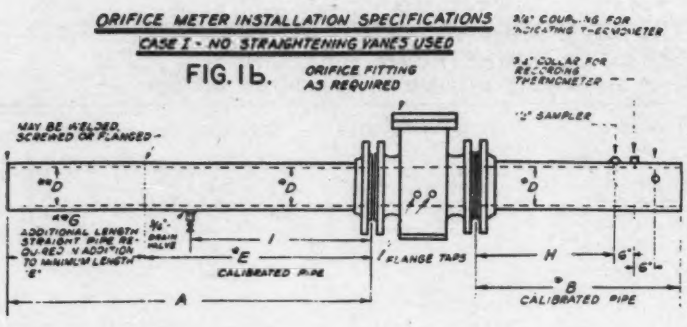
In case of swedges, upstream, the straightening vane can be placed in the pipe just upstream from the swedge. This will be equivalent to conditions I and III and not to II and IV.

W L Cowan - July 1935

ORIFICE METER INSTALLATION SPECIFICATIONS

CASE I - NO STRAIGHTENING VANES USED

FIG. 1b. ORIFICE FITTING AS REQUIRED



NOMINAL SIZE OF METER RUN	STANDARD INTERNAL DIA METER TUBE	LBS / FT	SPECIFICATIONS CALIBRATED PIPE — ALLOWABLE TOLERANCES IN (D) THE INSIDE DIAMETER OF PIPE — UPSTREAM SECTION E MIN DIA	UPSTREAM SECTION E MAX DIA	DOWNSTREAM SECTION B MIN DIA	DOWNSTREAM SECTION B MAX DIA	MINIMUM LENGTHS — TOTAL LENGTH STRAIGHT PIPE UPSTREAM	TOTAL LENGTH STRAIGHT CALIBRATED PIPE DOWNSTR.	TOTAL LENGTH STRAIGHT CALIBRATED PIPE UPSTR	ADDITIONAL LENGTH STRAIGHT CALIBRATED PIPE REQUIRED WHEN MINIMUM LENGTH "E" IS USED	DISTANCE TO SAMPLING CONNECTION	LOCATION OF DRAIN VALVE
	D						A	B	E	G	H	I
2	2.067	3.65	2.062	2.072	2.057	2.077	12'	3'	4'	8'	1'-6"	3'
3	3.068	7.57	3.060	3.076	3.053	3.083	18'	3'	6'	12'	1'-6"	5'
4	4.026	10.79	4.016	4.036	4.006	4.046	23'	4'	7'	16'	2'-6"	6'
6	6.065	18.97	6.050	6.080	6.035	6.095	35'	4'	10'	25'	2'-9"	8'
8	8.071	24.69	8.051	8.091	8.031	8.111	46'	5'	14'	32'	3'-6"	10'
10	10.190	31.20	10.164	10.215	10.139	10.241	58'	6'	17'	41'	4'-6"	12'
12	12.090	43.77	12.060	12.120	12.030	12.150	69'	7'	20'	49'	5'-6"	15'
16	15.250	62.57	15.212	15.288	15.174	15.326	87'	8'	26'	61'	6'-6"	20'
20	19.180	85.57	19.132	19.288	19.084	19.276	110'	10'	32'	78'	8'-6"	25'

* Pipe used for Sections B and E should be seamless and calibrated as specified to above tolerances in inside diameters.

** Pipe used to make up Section (C) should be kept straight in line with Section E but it may have any internal diameter corresponding to any pipe having same nominal size as meter tube.

Pipe should be screwed up completely through flanges and protruding section machined off flush with raised face of flange.

Gaskets should be of materials which are unaffected by fluid being metered (See notes under "Orifice Meter Installation" instructions under Section "Orifice Meter Installation Procedure."

For pipe taps, increase lengths A and B by distance between taps.

cient. Where a recording thermometer is to be installed, it is recommended that a second well be provided for checking the instrument against a glass bulb thermometer. Under certain conditions of flow where the temperature of the flowing fluid is markedly different from the ambient temperature, it may be found advisable to install an insulated thermometer well in the line. This will prevent the rapid dissipation of heat to or from the bulb of the thermometer and will help to eliminate error from this source. In any case, the thermometer well should be installed either vertically or at an angle above the horizontal so that liquid may be introduced into the space between the well and the thermometer bulb to aid the transfer of heat from one to the other. It will be found that heavy oil is satisfactory for this use in most cases.

Automatic Control

As has been indicated, the role of the automatic controller and motor valve is one of prime importance to the Natural Gasoline Plant. In fact it might be said that the rapid strides made by the industry in increasing the quality of their various hydrocarbon products has been largely due to the development and widespread use of temperature and pressure controllers. As we all know, the modern controller has come a long way since the days of simple "on-off" control, and it has been rumored that some operators anticipate the time soon when their tobacco will be automatically "chewed and spit" for them.

A general criterion for a good controller and its associated control valve, is that the valve lift should be proportional to pen movement throughout the range of valve and instrument travel and that equal percentage increments of valve lift should produce equal increments of flow. With the selection of a properly designed valve for the desired capacity and pressure drop conditions, the "floating or continuous" type controller may be set to maintain extremely accurate temperatures and pressures.

In designing the control installation, thought should be given to the possibility of the control air or gas being shut off. This is especially true during the present possibilities of war emergencies on the Coast. For this reason, at least one auxiliary source of control "air" or gas should be provided to automatically cut in where necessary. The motor valves controlling the exit of oil, gas or gasoline fractions from the various pressure vessels in the plant, could be of the normally closed type that will shut in the vessel if control air goes off and prevent the loss of inflammable material within the plant yard. Although it may be deemed advisable to provide lines which will automatically vent the contents of pressure vessels to some location outside of the plant in case of emergency. It is further recommended that some sort of remote control system be provided at the plant exits so that the boilers, compressors and heaters may be shut down by the operator in case an accident occurs which might result in a fire if these sources of ignition were present.

Wet Gas Measurement

In discussing the individual problems of measurement and control within our Natural Gasoline Plant, let us assume that the field produces high pressure wet gas, low pressure wet gas and vapors from oil storage tanks. This means that three gathering systems will be maintained and that the low pressure gas and vapors will be compressed to a higher pressure for absorption of their gasoline fractions. It is desirable that the gas entering our medium pressure gasoline plant, from each system, be metered so that a better check between field and plant volumes may be obtained. Although it is customary for a calculated wet gas figure (based on dry gas and vapors and the shrinkage volume) to be used as a check on the total of the individual wet field

Installed by Northern Division of Southern California Gas Company.

This efficient, natural gas installation at a Hollywood industrial plant features a Reliance Regulator, CBV-201 combination balanced valve model, and two Metric-American 500 B Ironcase Meters. The Reliance Regulator accurately reduces inlet pressure of 20 to 60 lbs. to a uniform outlet pressure of 10 lbs. for precise measuring by the American Meters.

RELIANCE REGULATOR CORPORATION
Alhambra, California

AMERICAN METER COMPANY
San Francisco—Los Angeles, California

AMERICAN METERS

AMERICAN METER CO EST 1924

RELIANCE REGULATORS

RELIANCE

meters, the master plant wet gas meters serve as an additional balance check and are very useful as operating guides within the plant. In order that the wet gas may be accurately measured by the orifice meter, it is necessary that all line condensate and oil are removed before the gas enters the meter run. For this purpose it is customary to install drip pots or a scrubber to remove the liquid before measurement. Where an accumulator is used its approximate size can be computed from the following formula as given by Mr. West.

$$D = \sqrt{\frac{c}{800\sqrt{P}}}$$

Where D = diameter of vessel in inches
c = cubic feet of gas/per day
P = Abs. pressure = lbs/in²

The length should be approximately three times the diameter for best results with inlet and outlet located near top of each end. Provision should be made for draining the vessel of liquid.

Pulsation

Another difficulty often encountered in the measurement of wet gas and vapors when the meter is located near the compressor suction is caused by pulsation. The pressure and velocity waves produced in the gas by the action of the reciprocating compressor cause errors in the differential reading which may amount to as much as 200%. By making the gage lines leading to each side of the meter approximately the same, the error due to the pressure pulsation can be largely eliminated. The only way to insure freedom from error due to the velocity waves however, is to damp the waves before they get to the meter run. This can be done by creating a pressure drop between the meter and compressor suction or by making the volume between these points comparatively large, or both. The relation between these factors is shown by the Hodgson equation.

$$F = \frac{0.25Q}{CR}$$

Where F = frequency of pulsation
Q = quantity of gas
C = Volume of piping between meter and compressors
R = Pressure drop between meter and compressors

Because it is important that the pressure drop in the suction to the compressor be kept to a minimum for highest compressor efficiency, it is usual practice to eliminate the pulsation by placing sufficient volume between the meter run and the compressors. This condition may be obtained by locating the meters at a distance from the compressors or by installing a scrubber or an accumulator just ahead of the compressor inlet. This same formula could be used to determine the proper location for a meter on the wet gas discharged from the compressor. Here it might be found advisable to install a regulator to maintain a pressure drop since the fractional damping of the velocity wave is much less at the higher pressures. However, in most cases, the volume represented by the high pressure condensate scrubber will be sufficient to "cushion out" the effect of the waves.

Another formula for estimating the size of pulsation dampening tanks was given by R. E. Morter of the Industrial Fuel Supply Company in 1939.

$$V = \frac{1500\,Q}{P}$$

Where V = Volume of tank in cubic feet
Q = Flow in MCF/24 hrs.
P = Absolute pressure

He suggests that the length of the tank be 1.75 times the diameter and that the inlet and outlet connections should be at opposite ends and 90° to each other. This design was based on experimental data and results have been very satisfactory.

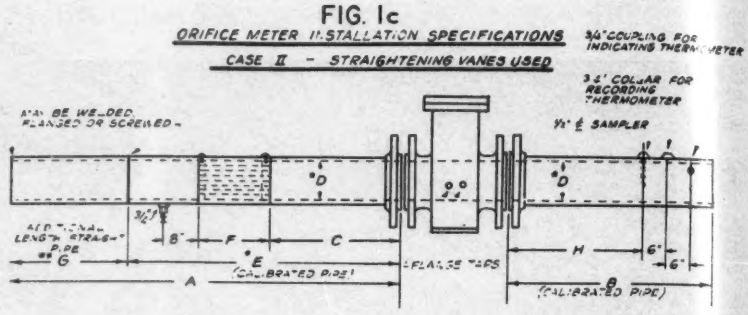
It has been common practice in the past to try to eliminate the effects of pulsation by installing a bushing between the high and low pots of the orifice gage. This should be discouraged since the average damped out differential seldom is the same as the average square root of the pulsatory differential which is the correct reading for determining actual flow volumes.

It may be mentioned here that care should be given the locating of the high pressure wet gas meter. It is found in most cases that progressive

FIG. Ic

ORIFICE METER INSTALLATION SPECIFICATIONS

CASE II - STRAIGHTENING VANES USED



NOMINAL SIZE OF METER RUN	STANDARD INTERNAL DIA METER TUBE	LBS / FT	SPECIFICATIONS CALIBRATED PIPE — ALLOWABLE TOLERANCES IN (D) THE INSIDE DIAMETER OF PIPE — UPSTREAM SECTION E MIN DIA	UPSTREAM SECTION E MAX DIA	DOWNSTREAM SECTION B MIN DIA	DOWNSTREAM SECTION B MAX DIA	MINIMUM LENGTHS — TOTAL LENGTH STRAIGHT PIPE UPSTREAM	TOTAL LENGTH STRAIGHT PIPE DOWNSTR.	DISTANCE TO STRAIGHTENING VANE	TOTAL LENGTH STRAIGHT CALIBRATED PIPE UPSTR	LENGTH OF STRAIGHTENING VANE	ADDITIONAL LENGTH OF STRAIGHT UNCALIBRATED PIPE REQUIRED IN ADDITION TO LENGTH OF (E) AND (B)	DISTANCE TO SAMPLING CONNECTIONS
	D						A	B	C	E	F	G	H
2	2.067	3.65	2.062	2.072	2.057	2.077	1'	3'	2'	3'	6"	2'	1'-6"
3	3.068	7.57	3.060	3.076	3.053	3.083	8'	3'	2'	4'	8"	4'	1'-6"
4	4.026	10.79	4.016	4.036	4.006	4.046	10'	4'	3'	5'	10"	5'	2'-6"
6	6.065	18.97	6.050	6.080	6.035	6.095	15'	4'	4'	8'	15"	7'	2'-9"
8	8.071	24.69	8.051	8.091	8.031	8.111	20'	5'	5-1/2'	10'	20"	10'	3'-6"
10	10.190	31.20	10.164	10.215	10.139	10.241	25'	6'	7'	13'	24"	12'	4'-6"
12	12.090	43.77	12.060	12.120	12.030	12.150	29'	7'	8'	15'	30"	14'	5'-6"
16	15.250	62.57	15.212	15.288	15.174	15.326	37'	8'	10'	19'	38"	18'	6'-6"
20	19.180	85.57	19.132	19.228	19.084	19.276	46'	10'	13'	24'	60"	22'	8'-6"

* Pipe used for Section B and E should be seamless and calibrated as specified above tolerances in inside diameter.

** Pipe used to make up Section G should be kept straight in line with Section E but it may have any internal diameter corresponding to any pipe having same nominal diameter as meter tube.

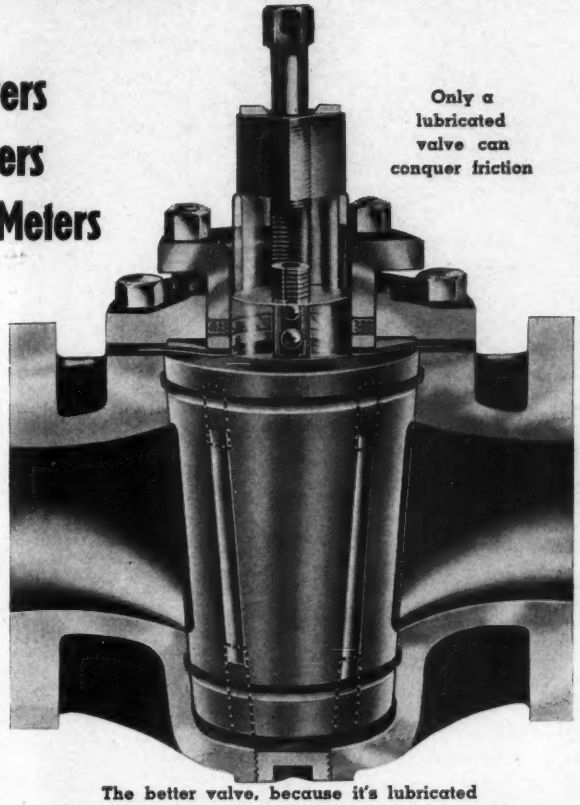
Pipe should be screwed up completely through flange and protruding section machined off flush with raised face of flange.

Gaskets should be of materials which are unaffected by fluid being metered (See notes under "Orifice Meter Installation" instructions under section "Orifice Meter Installation Procedure."

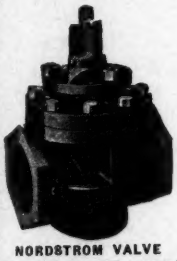
For measurement and control you'll get the best flowability through

NORDSTROM Valves
PITTSBURGH Oil and Gasoline Meters
PITTSBURGH-NATIONAL Water Meters
EMCO Orifice and Positive Vapor Meters
EMCO Gas Regulators

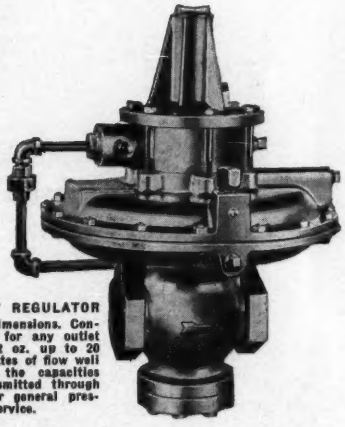
—engineered for
NATURAL GASOLINE PLANTS
REFINERIES AND BULK PLANTS
GAS, GASOLINE, OIL AND WATER LINES



Only a lubricated valve can conquer friction



NORDSTROM VALVE
Sizes ½" to 30"; wrench or gear operated; all pressure ratings; temperatures to 1000° F. See Refinery Composite Catalog.



EMCO "1001" REGULATOR
Compact in dimensions. Controls pressure for any outlet setting from 2 oz. up to 20 lbs., having rates of flow well in excess of the capacities normally transmitted through 2" pipe. For general pressure control service.

The better valve, because it's lubricated

In the measurement and control of the various fluids and gases in natural gasoline plants and in other branches of the gas and petroleum industries, Nordstrom Valves and companion products have proved their efficiency. Nordstrom Valves are preferred because they are LUBRICATED—always easy to turn, always sealed against leaks. The small amount of time required for occasional replenishment of lubricant is repaid many fold by their greatly increased life, safety and dependability.

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METERS AVAILABLE
Carried locally in stock. Complete proving and service facilities.

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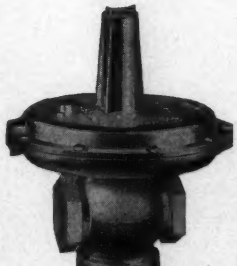
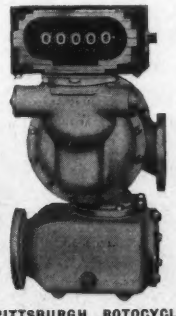
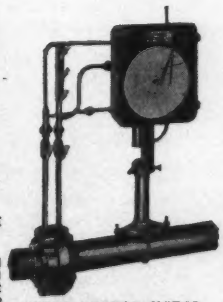
A complete line of meters for all water services, including Tropic, Imo and Empire-Streesmline types.



CRAWFORD REGULATOR
Recommended for services requiring highest accuracy for pressures of 1-lb. or less where supply pressures do not exceed 5 lbs. Highly popular on gas engine and boiler services.



PITTSBURGH ROTOCYCLE GASOLINE METER—TYPE B-2
Shown with Strainer and Straight Reading, Horizontal Setback Register. The most accurate means of gasoline measurement. A rotary, positive displacement meter. Also available with Vertical Dial Register.



EMCO ORIFICE METER
For large volume measurement of gas, steam, oil or other fluids.

MERCO NORDSTROM VALVE CO.—PITTSBURGH EQUITABLE METER CO.

So. Calif. Sales Offices and Factory Branch: 3138 E. 11th St., Los Angeles
Main Offices: Pittsburgh, Penna. Branches in principal cities.

FIG. Id
SPECIFICATIONS FOR ORIFICE FITTINGS

Bore Specifications:

Nominal Size	Standard Bore as per C.N.G.A. Bulletin TS-353	Allowable Variation in Bore ± 00.2%	
3"	3.068	3.062	3.074
4"	4.026	4.018	4.034
6"	6.065	6.053	6.077
8"	8.071	8.055	8.087
10"	10.19	10.170	10.210
12"	12.09	12.066	12.114
14"	13.25	13.224	13.276
16"	15.25	15.220	15.280
18"	17.18	17.146	17.214
20"	19.18	19.142	19.218
24"	23.25	23.204	23.296

Bore should be machined to as near the standard bore as possible. Average bore should be stamped on top of flange of fitting.

Orifice fittings having no defects in the bore of the fitting such as pits, scratches, etc., and which have bores within the allowable limits specified shall be acceptable unless otherwise specified.

Bores should be checked across the vertical and horizontal diameters at 1" in from each face of fitting, and at 1" from both sides of slot for orifice plates.

Bore of fitting should be smooth and free from pits, scratches, etc. Where these defects exist, they should be cleaned out and filled in with iron by means of the electric arc, and machined off smooth.

Pressure Tap Holes

Check pressure tap holes for leaks.

Set Screws for Holding Orifice Plate

Set screws should be carefully checked to see that they are in perfect condition and that the threads in fitting are in good condition. Set screws should be tight but they should not be so tight that they might bind.

pressure decline of the field will eventually necessitate the use of compressors for the proper treatment of this wet gas. When this is done it will entail the relocation of the wet gas meter to eliminate pulsation unless this meter has already been located at sufficient distance from the proposed compressor inlet.

Vapor Measurement

Where the wet gas or vapors coming into the plant at low pressure are rich in gasoline content, difficulty may be experienced due to condensation of the liquid in the gage lines of the meter, causing an erroneously high or low differential to be recorded. This condition can be alleviated by using large size gage lines and sloping them from the meter gage down to the meter run connection. This allows the condensate to run back into the line without forming "slugs" of liquid which would plug the line and give false differential readings. One company has used the method shown in Figure No. 2 to eliminate this trouble.

The gage lines are made in the form of coils with a continuous slope downward into the main line. The opening into the line was reamed out so that the liquid condensed by the large surface area of the coil could easily run back out of the gage lines without forming obstructions.

It is recommended that the meter runs used for the measurement of the various wet gases and vapors into the plant be of the "code" type. While these meters are not as important as the dry gas distribution meters, their place in the checking of plant volume balances justifies the additional degree of accuracy.

The Absorption System

After the measurement of the various wet gases and vapors into the plant and the extraction of the liquid condensate before and after compression they are treated in the absorbers to remove their valuable liquid constituents. Figure No. 3 represents a unit of the absorption system, each one of which would be identical, the number depending upon the desired capacity of the plant. It will be seen that no measurement or control of the gas is made until it has passed through the absorber. Although some plants at present measure the individual wet gas to each absorber as well as the dry gas out, in order to check the performance of each absorber, it is not generally felt to be justified. The measurement of the gas *out* of each

ORIFICE PLATE SPECIFICATIONS

AS DETERMINED FROM SPECIFICATIONS GIVEN IN C.N.G.A. BUL. TS. 353
W. L. COWAN — FEB. 18, 1934

FIG. 1e

SPECIFICATIONS BASED ON FOLLOWING REQUIREMENTS

t' must be $\frac{1}{16}$" or greater.

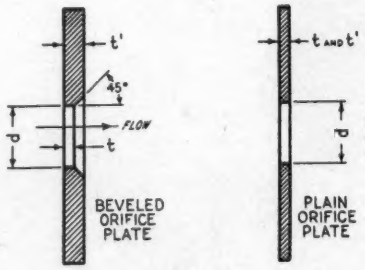
LETTING D = INTERNAL DIAM. OF PIPE

t = or is less than $\frac{1}{30}$D

.t = ... $\frac{1}{30}$D (preferably)

t = ... $\frac{1}{8}$d .

t = ... $\frac{D-d}{8}$



SPECIFICATIONS FOR t

ORIFICE DIAM. d	PIPE SIZE 2"	3"	4"	6"	8"	10" to 20"
.250"	1/32"	1/32"	1/32"			
.375"	"	3/64"	3/64"			
.500"	"	1/16"	1/16"			
.625"	"	"	"	1/16"		
.750"	"	"	"	3/32"		
.875"	"	"	"	"	3/32"	
1.000"	"	"	"	1/8"	1/8"	
FOR ALL ORIFICES GREATER THAN 1.0"	"	"	"	"	"	1/8"

SPECIFICATIONS FOR t'

t'	
PIPES	VARIATION
2" TO 4"	1/16" TO 1/8"
6" TO 12"	1/8" TO 1/4"
16" TO 20"	1/8" TO 3/8"

ADDITIONAL PLATE SPECIFICATIONS

Upstream face of plate must not depart from flatness more than .01" per inch of pipe radius, when in operation.

Upstream edge of orifice shall be cut square and sharp so that it will not appreciably reflect a beam of light when viewed without magnification.

RECOMMENDED RANGE OF $\beta = d/D$	Flange Taps	β From .15 to .70
	Pipe Taps	β " .20 " .67
PERMISSIBLE BUT NOT DESIRABLE RANGE OF β WHERE HIGH ACCURACY IS NOT ESSENTIAL	Flange Taps	β From .10 to .75
	Pipe Taps	β " .10 " .70

LABOR!!!
TIME!!!
MATERIAL!!!

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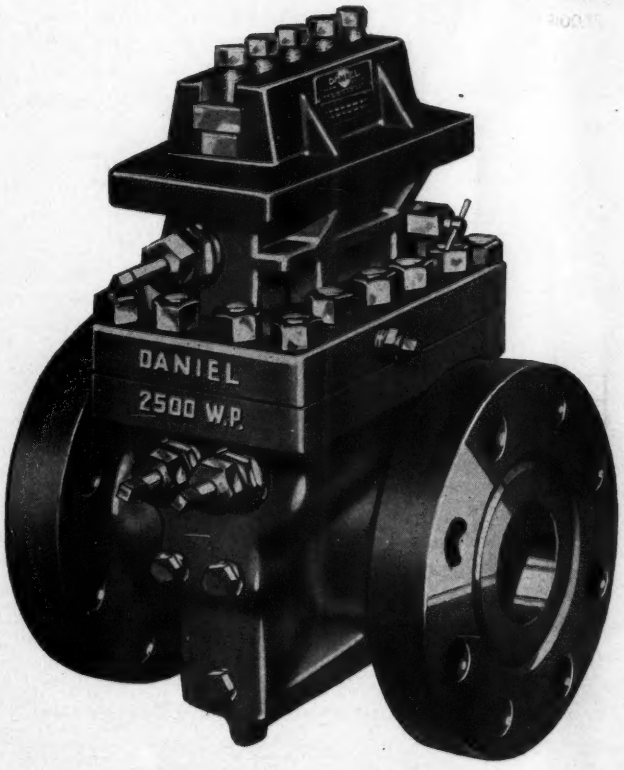
DANIEL SENIOR ORIFICE FITTINGS



CRITICAL MATERIALS and space are saved by the elimination of by-passes.

MAN HOURS are saved because plates can be easily and quickly changed by one man.

SHUT DOWNS are avoided and greater accuracy is obtained because plates can be changed or inspected under pressure.

These plus many other features of the DANIEL SENIOR ORIFICE FITTING combine to effect a real Dollar Savings.

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108 PORTWOOD ST.
HOUSTON, TEX.

absorber, however, is of definite value and "code" meter installations should be made. The individual meters are used to check the volume recorded by the master dry gas meter and also serve as an indication to the operator of the amount being treated by each absorber. It is customary for the absorber dry gas meter to be located on the vertical line from the top of the absorber to the ground and this practice is recommended since it conserves space and violates no principle of good measurement. The meter is, of course, located at ground level and the gage lines run upward to the meter run. Pots should be installed at the meter to prevent any liquid from accumulating in the lines.

It is important as an operating guide that individual oil meters be installed on the absorbers although they may be of the non-code type. Here again it is recommended that pots be installed at the meter so that any accumulated water in the oil may be drained from the gage lines. The importance of these meters lies in the fact that for efficient operation, certain absorption factors must be maintained, and to do this the ratio of oil to gas must be known. Since the volume rate of wet gas treated remains generally constant, the rate of oil is usually hand set by means of a pinched valve, against which the lean oil pumps maintain a constant pressure, or by hand controlling the rate of steam to the pumps.

In order that the absorption in the tower may be controlled, it is necessary that constant pressure be maintained. For this purpose a back pressure regulator is installed on the residue gas from the absorber, and where several towers are in operation, should be placed in the master dry gas line downstream of the master dry meter. Since it is desirable that the absorber pressure remain absolutely constant, regardless of rate of flow, it is recommended that a pilot operated regulator be used.

A liquid level control must be installed on each absorber to maintain the flow of rich oil from the absorber and hold an approximately constant level in the tower. While it is possible to use the ordinary float ball type of control, directly operating a valve on the oil line, it is recommended for new installations that a controller pneumatically operating a motor valve be used. This type of control will maintain a much closer level under all flow conditions and can be better sized to suit particular needs.

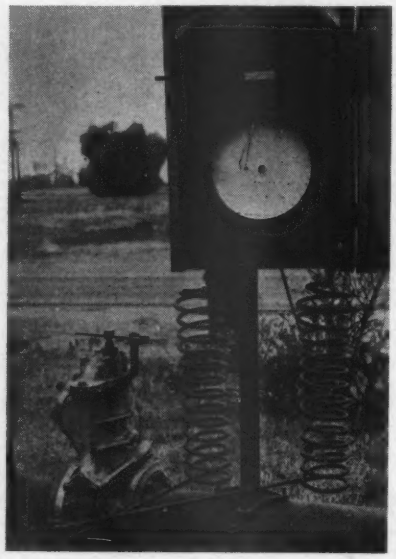


Figure 2

All of these controls and meters will apply to the vapor absorber, when one is used to treat the various plant vapors. One further control should be added however, because of the fact that the rate of vapors going to the absorber generally fluctuates over wide ranges. It would be impossible for hand control of the oil rate to this absorber to give the desired constancy of oil gas ratio, and so the installation of a ratio controller is recommended. This controller operates a motor valve on the lean oil line to maintain a constant ratio between the differentials recorded by the oil and gas flowmeters. By placing the vapor aborber residue gas meter upstream of the back-pressure regulator, the pressure recording is held constant and the volume ratio is maintained in direct proportion to the ratio of the differentials. Most controllers are constructed so that the ratio can be set within the instrument to any figure desired by the operator.

Dry Gas Distribution

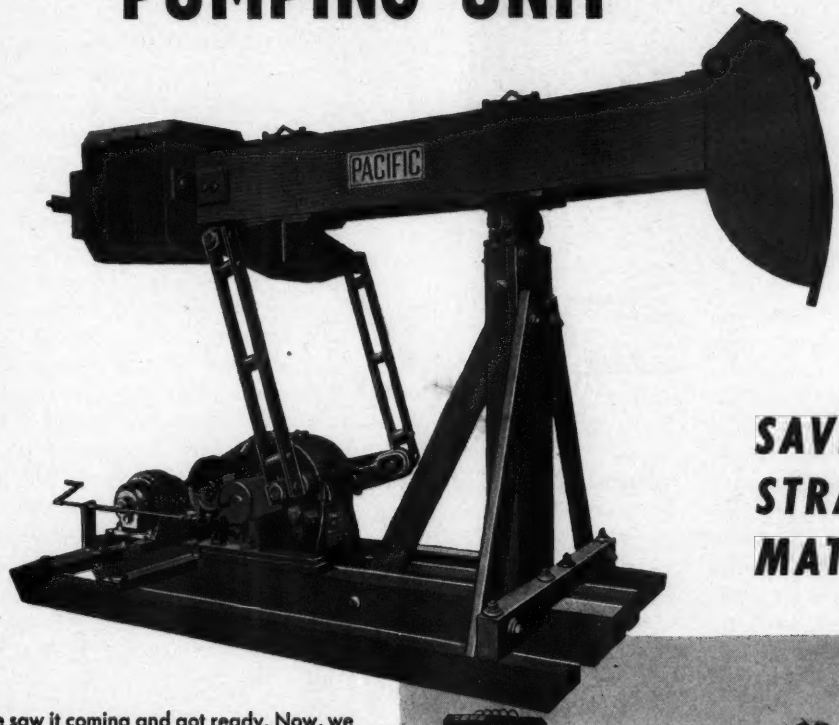
Downstream of the master dry gas regulator, the various high pressure dry distribution meters are manifolded. These should be "code" installations. It is usual practice for the discharge of the regulator to enter a large manifold line out of which the gas is distributed. In most plants the order of precedence of these services is; first to plant fuel, next to the field fuel, third to sales and lastly to the air stack. By maintaining proper pressure control on each line this order may be easily obtained. Each of these services should be metered using a "code" meter run and meter set-up. The regulators for the plant and field fuel lines should be direct operated reducing regulators with the pressure setting lower on the plant line. In addition, it will be necessary to install a back-pressure regulator on the field fuel line set to close as the pressure becomes lower than that necessary for plant needs in case there is insufficient for both. The sales pressure usually depends on that maintained by the receiving company, although a pilot operated back pressure regulator should be installed to protect this plant pressure against any sudden draw-off of gas. This regulator should be set at a pressure lower than the regular sales delivery pressure but above that of the plant and field fuel. The gas to air regulator should be a pilot operated back pressure valve set higher than the delivery to sales pressure, but lower than the master dry out regulator.

Although this particular case will not fit all plants, similar pressure control will permit proper distribution of the gas. Care should be taken to protect the plant against sudden draw-off of gas by reason of sudden loads or line breaks. Provision should always be made for venting excess dry gas or vapors to air at a stack away from the plant.

Rich Oil Measurement

The rich or fat oil, after passing from the absorbers, is usually flashed into a vent tank in order that fixed gases may be removed before the oil enters the still. The vapors from this tank commonly enter the recycle stream and are picked up in the vacuum compressor intake. These va-

THE NEW PACIFIC WOOD PUMPING UNIT



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We saw it coming and got ready. Now, we offer you a carefully designed, self-contained, treated timber pumping unit with all the advantages of steel.

Already tested and in the field, these twin-crank units are strong, and are protected against fire, termites and decay.

Counterbalances are cast from non-strategic "Barycrete"—a mixture of Barytes ore and cement—with almost the weight of cast iron.

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pors should be measured and an orifice meter set-up similar to the plant vacuum intake meter should be used. It is customary to maintain a pressure of around 5 lbs. to 10 lbs. on the rich oil vent tank and a direct operated back-pressure regulator should be set on the vapor line for this purpose. If the meter is located downstream of the regulator, the expansion of the vapor will help prevent condensation of liquid in the meter gage lines.

It is not entirely necessary to measure the rich oil to the still where the ratio of steam to lean oil is used for a stripping basis. However, modern plant practice seems to favor the use of direct fired preheaters, and where more than one of these are used it is advantageous for rich oil meters to be installed on each heater so that the load may be equally distributed between them. An overhead meter run is recommended for this installation using taps located on the side of the line and vent pots for each gage line so that any accumulated vapor may be vented off. It is not necessary for seals to be used. Where gas fired heaters are used the fuel should be measured to them by meter so that their operating efficiencies may be checked. When vapors are used, the meter set-up will be the same as that described for plant intake vapors.

Distillation System

The plant still operates to strip the gasoline constituents from the absorption oil which may then be cooled and stored for return to the absorber. Figure 4 shows a representative diagramatic sketch of the distilling unit. The pressure on the still is controlled by direct operated back-pressure regulator on the run-down vapors. These vapors should be measured by non-code meter set-up. Liquid level controls of the pneumatically operated motor valve type, are recommended for the maintaining level of oil in the still and of gasoline and water in the run-down tank.

The spray steam to the still and the preheater steam should be measured using overhead horizontal meter runs which have been preceded by steam traps. It has been found advantageous to rotate the orifice fitting so that the taps are located near the top of the line. The taps should connect over to water condensing pots and gage lines run down to the meter. The steam meters may be non-code in construction.

A non-code meter run set-up may be used for the measurement of the reflux to the still, although it is possible for positive meters to be installed for this purpose. The reflux

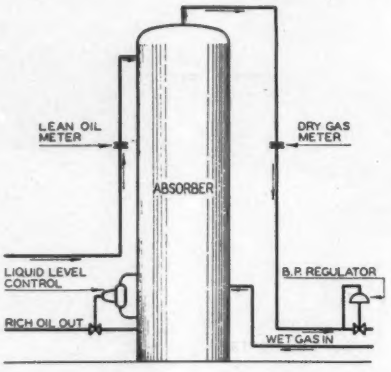

Figure 3

rate must be controlled in order that a uniform overhead product may be obtained. This is accomplished by maintaining the top temperature constant. A recording temperature controller should be installed with its actuating element located in the overhead line from the still. The instrument should be connected to operate a steam motor valve which will control the reflux pumps and insure the proper amount of cooling medium to the still. A temperature recorder should be set up for recording the bottom temperature of the still, since this must be used as an operating guide for the efficient stripping of the oil. By combining the operation of the various still meters and controllers with information obtained by testing the products, a high quality "raw" gasoline of uniform characteristics may be produced.

Storage of Gasoline

If no further stabilization of the gasoline is desired, the product is taken from the run-down tank into storage tanks to await shipment or use. The vessel used for gasoline storage should be protected by safety valves and vacuum breakers to prevent over or under pressuring the tank. The vapors which may be given off from the tanks should be controlled by a direct operated back pressure regulator, and should be measured by a non-code meter set-up back into the plant vapor recycle system. It may be found advantageous to install a remote liquid level recorder in the plant control house to indicate the level of the gasoline in the storage tanks.

Rectification or Fractionation System

When rectification of the raw gasoline is desired, a unit or units similar to that shown in Figure 5 may be used. With the current demand for iso-butane as alkylation stock and propane and normal butane for liquified fuel, it is economically profitable to progressively separate these constituents in a series of fractionating units. The measurements of the various liquid products and control streams in this section of plant operation may be accomplished by the use of positive meters. The difficulty of measuring these volatile products by orifice meter is due to the tendency of the liquid to vaporize in the lead lines, causing large errors in the gage reading. The accuracy obtained by the positive meters is in general higher than that possible with the orifice meter.

The accurate control of temperature and pressure on the fractionating columns is more necessary for the production of these fractions than for any other plant operation Any reasonable expense incurred for the purpose of maintaining the closest possible accuracy will be more than repaid in the salability of the refined products.

The pressure of the fractionating units should be maintained with back-pressure motor valves located on the vapor line off the accumulator and actuated by a recording pressure controller, which may be located in a central control house. Meters should be provided for measuring the feed and reflux rates and also for the various products off of the fractionating units. The uncondensed vapors should be measured by an orifice meter so that a com-

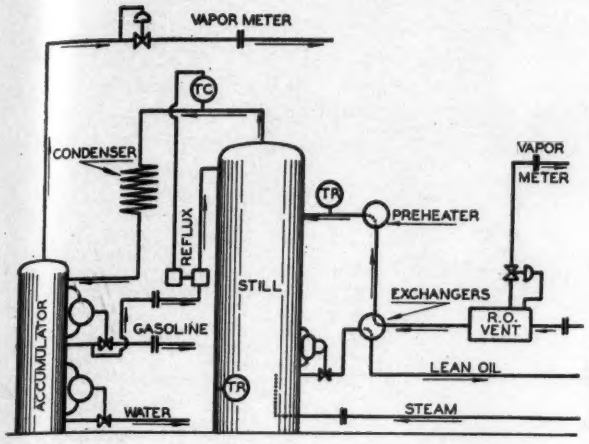

Figure 4

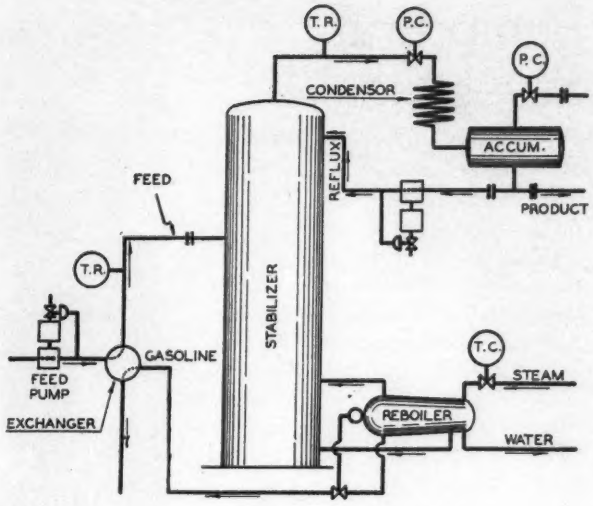

Figure 5

plete volume balance of products in and out may be kept.

The temperature of the bottom of the column is maintained by a controller-recorder whose actuating bulb should be located either in the reboiler or in the lower part of the column. The selection of this control point should be made with the thought in mind that the quality of the bottom product will depend on holding the bottom temperature constant and also that the point of change of maximum temperature change with process changes will give the closest control. The top temperature, which determines the type of top product removed, should be controlled by the same type of instrument.

Water measurement, where it is required for accounting purposes, should be made with a positive meter. Where it is made for operating purposes, measurement by weir is sufficiently accurate. The weir can usually be installed in the suction pit of the basin.

Maintenance of water levels in cooling tower basins may be provided by pneumatically operated float controllers. Other auxiliary equipment should be investigated to provide automatic control wherever possible and profitable.

Where it is necessary to use sealing pots and water seals in the gage lines between the meter run and the gage, difficulty may be experienced in the winter because of the freezing of the water. This difficulty may be overcome by adding antifreeze solution such as glycol or glycerine. It should be noted that if this is done, a special sealing factor will have to be used in calculating the orifice meter coefficient, based on the density of the mixture.

As a concluding theme, it should be remembered that the successful operation of any Natural Gasoline Plant depends to a large extent on two factors: first, a sound basic design for plant equipment and second, the operation of the finished plant at highest possible efficiency. The place of measurement and control in the fulfillment of these points is of greatest importance to the operator and should be given careful consideration.

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California Oil and Gas Fields

in the

Second Issue August, 1942

Will Provide More Than 30 pages of Concise Information

Valued by Drillers and Producers

Pump Unit Saves Steel

The oil industry has come in for its share of criticism in connection with failure to be ready for a full fledged war but a number of instances stand out and indicate that those in this industry were actually ahead of the business field in anticipating future shortages of power and material. One of these instances can be found in the matter of self-contained pumping units.

For a number of years in California fields the trend has been to supercede individual power and pumping units with smaller and more efficient combination of portable type, single-well, walking beam unit. These have evolved from the standard end, single crank, concrete foundation type to the portable or semi-portable, twin-crank, self-contained pumping unit. These units have normally been constructed of cast iron, cast steel and structural steel.

One of the largest manufacturers of such self contained, portable pumping units in this area is the Pacific Gear Works of Los Angeles.

When armaments and defense construction started to skyrocket, the engineers of this organization foresaw that material shortage would soon curtail if not eliminate this important branch of their business. Investigations were commenced and pumping units were designed in non-critical materials. Some were actually built and tested to reveal manufacturing problems.

Out of these investigations has come a timely answer to producers demands—an efficient, self-contained pumping unit containing a minimum amount of iron and steel.

The first of these new pumping units has been delivered, installed and is now in operation in the Central California fields. It is constructed with a complete frame and walking beam of selected Douglas fir timber. Its counteralance weights are cast of a combination of barium ore and Portland cement. Such an expedient seems simple enough yet there are many weeks of careful study wrapped up in every part of the new unit.

Critical materials were saved in this new unit.

The timber frame for instance is a fine example of the newest mechanical research into "engineered lumber." A very brief study of the forces involved makes it immediately apparent that a pumping unit frame is not a simple "building type" structure. High concentrations of reversing live loads are encountered, and these are frequent and severe. Shock loads are continually present, and a unit is required to stand up for years under this most severe service. Weather conditions in the oil fields are bad, and most units are completely exposed to all the elements. Live loads and reversal of stresses cause a loosening of nailed or bolted joints and natural shrinkage of the wood adds to this weakening. All joints in a timber pumping unit frame require special consideration. In addition there is the ever-present danger to timber of dry-rot, termites and fire.

Timber connectors are revolutionizing design of wood structure by increasing the percentage of usable structural strength at connections.

Pacific Gear engineers met the problem of stress at bolted connections in their unit by using steel timber connectors and shear plates at all connections under stress. They overcame the natural hazards to timber by preframing the units then pressure treating the pieces with chromated zinc chloride salts. Such treatment renders the timber poisonous to termites and fungi, and so fills the wood cells with neutral salts that the wood will not support combustion even when subjected to intense heat. Moreover surface checking and weathering of the timber is retarded. Timber so treated is paintable, clean and odorless. By preframing, all surfaces are uniformly treated including the inside of bolt holes so that there are no points of ingress for wood destroyers.

Timber connectors are metal discs, either square or circular and provided with teeth on each face, or a projecting ring around the circumference. They are either driven or morticed into the faces of timbers to be joined, so that the bolt fastening the timbers together, passes

through the center of the connector. Inasmuch as the bolt is in contact with the connector over its entire circumference, the stress exerted by the bolt when it is under tension or compression, usually against the wood area surrounding the hole, is exerted against the entire area of timber against which the teeth or ring of the connector can act.

In order to insure a sufficient quantity of connectors with which to fabricate the timber frames and the laminated walking beams (in larger pumping units) a diligent search was conducted among lumber and hardware dealers till an adequate supply was on hand to take care of future needs.

The counterbalances were the result of experiment in which many materials were tried out. The combination of barium ore, which is very heavy, and Portland cement gave a hard, durable weight of approximately 400 pounds per unit, at an econommical cost. This material has ⅔ the weight of cast iron and actually displaced most of the cast iron on the pumping unit.

In order to secure a correct beam balance with the large "wafer type" counterweights, adjustment rods were threaded through holes cast in the weights. These rods allowed the weights to be slipped forward or backward on the walking beam, and when properly balanced with the rod load, facilitated securing the weights in position by means of lock nuts. Counterweights have cast-in lift hooks to make handling easy.

When the first of these timber pumping units was completed it was submitted to the Petroleum Coordinator and Office of Price Administration and received especial commendation from executives in both organizations. An example of the steel and iron saved can be seen in the fact that a standard structural steel self-contained pumping unit built to handle 5 horsepower and a polish rod load of 8,000 pounds, with counterbalances will use 6,000 pounds of iron and steel. The Pacific timber pumping unit of similar capacity will use but 1700 pounds of metal—a clear saving of over 2 tons per unit.

These units moreover sell at a lower cost than steel units, while Pacific Gear engineers state that there has been no loss of desirable operating features over the steel framed unit. They point out also that with this unit operators can use 4-pole electric motors even at the slowest pumping speeds. And 4-pole motors are about all that can be purchased at the present time.

It is planned to produce these units in a full range of sizes from a polish rod load of 6000 pounds on up.

Bride: And what will you do for me if I always cook your meals just like this one?

Hubby: Take out some more life insurance.

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T H I S

L A U G H

O F F ! !

Spence Taylor joins the contributors with:

Two brothers parted to seek their fortunes. One found success in New York, the other in the Montana oil fields.

After many years the Montana brother visited the New York brother, a banker. Following a sumptuous dinner, the New Yorker discovered he was out of cigars; he called his butler and gave him a dollar to get some. He then pulled out his watch and remarked: "Now James is getting his hat . . . now he's he's going out the door . . . now he's at the store . . . now he's returning. James, bring in the cigars." Sure enough, in came James. The Montanan was impressed.

The following year the New Yorker visited Montana. After a fine dinner the Montana brother called Mose, his servant, and gave him a dollar to get some cigars. As the other brother had done, he pulled out his watch and remarked: "Now Mose is climbing in his car . . . now he's at the store . . . now he's returning and coming in the gate. Mose, bring in the cigars." Mose stuck his head in the door, scratched it and said: "Boss, I can't even find my hat."

Jerry O'Brien got a laugh out of this one:

A young matron taking first aid training had reached the Resuscitation Stage. One evening on a darkened street she observed a man sprawled face downward. "Aha," thought the young matron, "Providence has sent me hither to minister to this poor unfortunate." Parking her car she rushed over and began the resuscitation treatment. Presently he stirred and looked up, "Lady, I don't know what the hell you're up to, but I wish you'd quit tickling me. I'm holding a lantern for this guy working down in this manhole."

The tough army sergeant assigned to the newly organized women's army, barked the command:

"Prepare for inspection; disrobe to the waist."

The newly enlisted girls hesitated a moment, then, realizing that they were in the army, complied with the order.

The colonel walked out onto the field, took one look and shouted:

"Sergeant! What's going on here? I ordered kit inspection."

"Help your wife. When she washes the dishes, wash the dishes with her; when she mops the floor, mop up the floor with her."

Overheard by **Roy Hitchcock:**

The family had a guest for the night, and as there was no extra bed, he and the small son were bedfellows. The guest was first in bed, and watched the boy undress. When the latter had adjusted his night clothes, he knelt at the side of the bed and bowed his head. The guest thought that he had better follow the lad's example and say his prayers. Getting out on the opposite side of the bed, he knelt, but was startled by the laughter of his young friend.

"What are you laughing at?" he inquired.

"You'll catch it from Mother in the morning; it's on this side."

An actor who was staying at a hotel in the provinces went to the office one morning and said to the young lady in charge:

"I've never seen such dirty towels in my life! And I never can find any soap!"

"Well," retorted the young lady, "you've got a tongue in your head, haven't you?"

"Sure," replied the actor, "but I'm not a cat!"

Names used on this page are entirely fictitious, and any resemblance to persons either living or dead is purely coincidental.

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Field Development

Los Angeles Basin

Ground Work Laid For Harbor Drilling

The paper work necessary for an OK on an 81 well Wilmington heavy oil developmemnt program was completed when Union Pacific Railroad, General Pet. Corp., Long Beach Oil Development Co. and Brookline Oil Co. filed a joint proposal covering the project. The application seeks permission for the wells within the limits of Tar zone production on a 1 well to 10 acre basis with specific permission to also take in the Ranger zone where such conditions are found desirable. It is thought that this method will afford the greatest fuel oil recovery with a minimum consumption of critical steel stocks.

This program is considered extensive enough to serve as an adequate test of the practicability of maintaining the 1 to 10 acre spacing program in this field. Many competent engineers maintain that the recoveries on this basis will be low enough to justify their opinion that the field can most efficiently be developed on a 1 to 5 acre spacing program and so in effect force a revision of policy if the field is to produce its maximum share of the much needed fuel oil.

The current program will go a long way toward increasing heavy oil volumes in the Basin, but if the 4400 acres considered capable of heavy oil production are to be utilized at maximum many more wells must be put down. At present some 1088 wells in the field yield a daily average of approximately 89,000 barrels per day. Maintaining this ratio it becomes apparent how many more wells are required to materially raise the daily output. It is true that the maximum effective rate of production is placed in excess of 125,000 bbls. per day by the full utilization of existing wells but it is being daily demonstrated that the wells capable of producing only the 24 gravity or less oil are generally incapable of greater capacity and the volume can only be swelled by additional drilling.

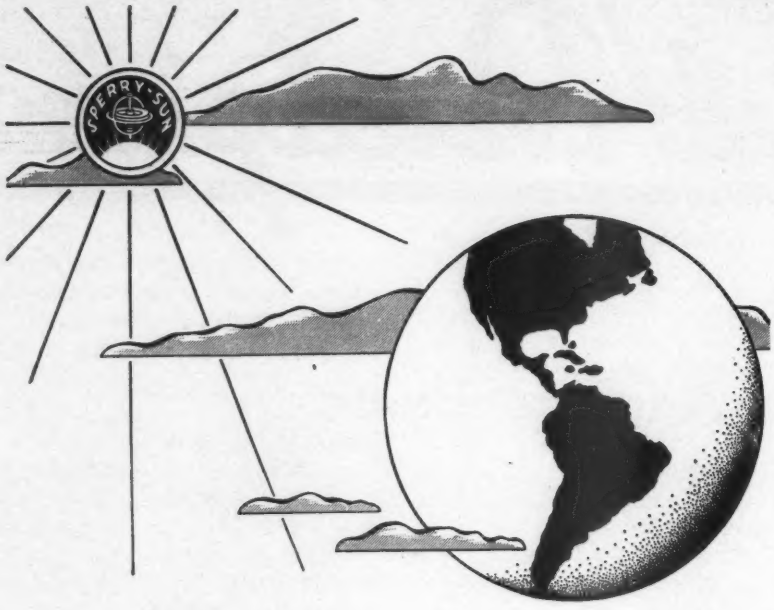
Long Beach Oil Development already has permission for 10 wells on the "W" parcel in the Terminal Island sector and is rigging up on the first three with the remaining seven being readied.

Activity in the balance of the field remains generally slow pending the amendment of M-68 regulations as they affect this particular field. In the central section Union Pacific Railroad Co. finished No. 218 pumping 184 bbls. of clean 23.8 gravity oil from the Terminal zone at 3465 ft. and is preparing to finish No. E-40.

In the town lot area Macson Oil

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Castaic	The Texas Co., Towle	1	3, 4-17	3704	Drilling
	Young, Roy W., Inc., Walker	1	11, 5-16	9981	Fishing D. P.
La Mirada	The Texas Co., McNally	A-2	15, 3-11	9658	Abandoned
Las Llajas	West'n. Gulf O. Co., Brady	1	13-3-17		Rigging Up
Newhall	James C. Brazell, Trustee, Perkins	1	11, 3-16	4443	Stdg. Cem.
Puente Hills	Continental Oil Co., Turnbull	3	13, 2-11	3801	Swabbing
	Melvin Hansen, Dragna	1	24, 2-10	2230	Repairing equipment
Rio Hondo	Potrero Oil Co., Newman	1	32. 1-11	5430	Idle
San Fernando	Barnsdall Oil Co., T.I.T.	1	30, 3-15	8035	Abandoned
	Fernando Oils, Ltd., Chatsworth	1	18, 2-16		Rig
	Tide Water Assoc., Sesnon	1	28, 3-16	8912	Prep to redrill
Whittier-La Habra	Los Nietos Valley Oil Co., Woodward	1	29, 2-11	2030	Drilling
	Orange County				
Anaheim	The Texas Co., Buena Park	4E-1	36, 3-11	10,044	Testing
Bolsa Chica	La Bolsa Ro. Synd., Crane	1	22, 5-11	7310	Idle
Kraemer	Hamilton & Sherman, Kramer	3-2	31, 3-9	4402	Drilling
Costa Mesa	Thompson, Milton N., Banning	1	9, 6-10	5649	Idle
Yorba Linda	Shell Oil Co., Orlinda Fee No. 4.	55-16	16,3-9		Foundation
	Shell Oil Co., Orlinda Orlinda Fee No. 4	77-16	13-3-17	1649	Drilling
	San Bernardino County				
Carbon Canyon	Stella, E. F., McDermott	2	5, 3-8	105	Drilling
	Union Oil Co., Newman Bros.	1	2, 3-8	4060	Drilling



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E-C Inclinometer	**K-K Whipstock**
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Co. is redrilling C-55-2 and Oil Investments, Inc. redrilled and completed Millside No. 1 for 100 bbls. of 14 plus gravity oil and is preparing to move to Advance Truck No. 4 for a similar job. Brain & Cooper, Inc. are swabbing Mouche No. 1 after redrilling to 3590 ft. Royalty Service Corp. and Olympic Refining Co. each plan an immediate redrill in the townlot area.

In the Long Beach Harbor area of the field, D. D. Dunlap & Jonah Jones, Jr. are building rig for L. B. H. D.-Cerritos No. 2.

Shell Oil Starts Yorba Linda Program

Shell Oil Co., Inc. has started the first two of a scheduled 18 well program at the northerly flank of the Yorba Linda field in Orange county. Located northwest of Citrus and Eureka streets in sec. 16, 3s-9w, the wells seek low gravity Pliocene oil so much in current demand. First to get under way was Olinda Fee No. 4-77-16, currently reported coring at 1650 ft. while foundation has been poured for No. 55-16. It is intended to keep one string of tools continuously at work on this project.

Two Complete At Del Valle

In the westerly Del Valle Pool two good producers have been added to field assets. First in was Ohio Oil Co.'s Vasquez No. 3 completed at 6044 ft. flowing 36.3 gravity clean oil at 550 bbl. rate through a 2/64 in. bean under 1275 lbs. tubing pressure. Gas during the flow was measured at a 2,275,000 cu. ft. rate. Next to the tanks was Standard Oil Co.'s Sepulveda No. 3, on an offset location which finished at 5120 ft. flowing 1576 bbls. of clean 33.8 gravity oil through a 1 in. bean and 450,000 cu. ft. of gas.

In the easterly or original Del Valle Pool, its discoverer, R. E. Havenstrite, Operator, is running casing to 2200 ft. to sleeve off loose formation which has been robbing circulation from Barnes No. 2. This

well is bottomed at 6915 ft. in shale with streaks of oil sand which apparently are new showings since the expected good Del Valle zone sands were cored in the interval 6548 to 6750 ft.

Tide Water To Redrill San Fernando Wildcat

Tide Water Assoc. Oil Co. is preparing to plug and redrill its San Fernando area wildcat Sesnon No. 1. Located near the center of sec. 28, 3n-16w a ½ mile west of the Aliso Canyon field, the well bottomed at 8912 ft. in the Porter 12 zone, produced in the adjacent field, and was completed as a gasser flowing at varying rates from 291,000 to 3,100,000 cu. ft. It is expected that the well will directionally redrill to the east in the hope of finding the sands capable of better production nearer the field and away from the old hole.

Near the city reservoir on sec. 30, 3n-15w the same area, Barnsdall Oil Co. abandoned T. I. T. No. 1 in Pliocene shale at 8035 ft. without having encountered showings.

Signal Oil Completes At Huntington Beach

At the westerly flank of Huntington Beach Signal Oil & Gas Co. effected another of its good completions when Signal-Bolsa No. 34-A finished at 4900 ft. flowing 25 gravity oil cutting 9 percent at a 500 bbl. daily rate. The company is continuing by rigging up No. 42 on a nearby location.

Southeast of here, nearer main field limits, Standard Oil Co.'s semi-wildcat, Huntington No. A-37, is coring and testing at 3477 ft. Formation tests at frequent intervals have recovered oil-gas showings from the shale and tar streaked formation.

In the tideland section of the field several operators are preparing to file for permission to perforate old wells in the Jones sand which Wilshire Oil Co. recently demonstrated to be capable of good production. The Office of Petroleum Coordinator has intimated that such proposals will be granted providing the methods to be employed are in accord with good engineering principles and adequate spacing is allowed for.

Conoco Swabss Turnbull Well

Continental Oil Co. is near an answer on its third Turnbull Canyon well on sec. 13,2s-11w. Originally drilled to a barron 5608 ft. the well was directionally redrilled through a fault to 3801 ft. A formation test which recovered a considerable amount of grassy oil prompted casing to be set at 3409 ft. and 5 in. perforated liner landed on bottom for production trial. At last report the well was swabbing and flowing by heads with the last cut down to 16 percent water.

Texaco Abandons La Mirada Wildcat

The Texas Co. abandoned McNally No. A-2 in the La Mirada area at 9658 ft. after exhaustive tests resulted only in traces of oil and gas. Located on sec. 15, 3s-11w between West Coyote and Santa Fe Springs, the well sought a new field comparable to the production found in the nearby areas.

Carbon Canyon Sees Activity

Carbon Canyon activity is stepping up with three operators actively engaged in search of production. Nearest an answer is Union Oil Co.'s Newman No. 1 on sec. 2, 3s-8w which was last reported drilling in Puente shale at 4060 ft. after finding fair oil showings near 3500 ft. On section 5 of the township E. F. Stella McDermott No. 2 is drilling at 105 ft. is hard shale while the operator's Pellissier well is conducting swabbing trials. Soon also to engage in development is Municipal Oil Co. now preparing to enter and deepen the old Mahala Oil & Gas Co. wildcat in section 13.

Buena Park Well Testing for WSO

In the Buena Park area The Texas Co.'s 4-E No. 1 is testing for a water shut off on oil sands difficult to isolate, since fingers of gray sand grade in to the oil sands without definite shale partings. Bottomed at 10,044 ft. the well was cased to 9651 ft. with a string of 5½ in. and the gun perforating and squeezing program instituted. Running much lower than the discovery Spen-

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cer No. 1, the current well is not expected to be a phenomenal producer but is expected to make some oil. Most engineers agree that the showings thus far in the area do indicate a field of major importance exists nearby, with the discovery of good saturation complicated by extremely complex sub-surface geology.

Prep. To Spud L. A. Co. "Cat"

South of Pico Canyon in westerly Los Angeles county Western Gulf Oil Co. is preparing to spud a new widcat in search of Modelo zone production. Located on sec. 13, 3n-17w the well, Brady Estate No. 1, will be the first exploration of the district known as the Las Llajas area.

Union Finishes Good Pumper

Union Oil Co.'s recent work in the Brea-Olinda field was substantially rewarded when its Sterns No. 72 was finished at 3375 ft. pumping 256 bbls. of 14.9 gravity oil with a 12 percent cut. In continuation the company is drilling No. 73 at 720 ft. and has staked location for No. 74. In the northwest end of the field Shell Oil Co.'s Orange No. 23 is drilling at 4834 ft.

C.N.G.A. Forms War Activities Group

With a number of its members serving on various government and war committees, the formation of a War Activities Committee, consisting of these men, as a move to coordinate the aid which the natural gasoline industry can give the war effort is announced by the California Natural Gasoline Association.

The committee consists of W. W. Robinson, The Texas Co., and a member of the California Oil Industry Salvage Committee, chairman; William Moeller, Southern California Gas Co., chairman of the Natural Gas and Natural Gasoline Committee, District 5; H. L. Eggleston, Gilmore Oil Co., chairman, Temporary Sub-Committee on Natural Gasoline and Coordination of Iso-Butane, District 5; P. S. Magruder, General Petroleum Corp., member of the Oil Industry Protection Committee; and R. D. Gibbs, chairman of the C.N.G.A. Gas Report Committee. Ex-officio member of the committee is George L. Tyler, C.N.G.A. secretary.

The appointment of the committee is designed to bring together those members serving on special committees outside C.N.G.A. but whose functions have a bearing on the natural gasoline industry who are working with special war-time questions and problems so that the full aid of the Association and its various technical committees can most effectively be applied.

Automobile riding was reduced by 60 percent during the first two days of gasoline rationing in North Carolina.

Gotkool
WATER CANS & COOLERS
GOTT Water Coolers are the convenient way to keep drinking water handy to the worker, protect it from impurities. Their exclusive construction keeps water cool for long periods. Snug fitting large removable top, handy non-leaking push button faucet. GOTT Water Cans for handy field use. Your Supply Store has them, get one today!
GOTKOOL WATER COOLER Made in 2, 3, 5, 8, 10, 15 and 20 gallon sizes.
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HOW BOWEN TOOLS CONSERVE COSTLY WELL EQUIPMENT
BOWEN DIE COLLARS and TAPS give a stronger, safer grip!
There are many conditions in fishing operations where success or failure of the job can hinge on proper use of Die Collars and Taper Taps. And show us the oil man today who can afford to risk failure on any fishing job he tackles!
Bowen Die Collars have accurately machined carburized threads that cut the outer surface of the hardest alloy pipe and hold with a grip that'll take all the punishing strains, you want to apply. Bowen Taper Taps have just the right amount of taper to cut a deep inside thread, and plenty of strength in their forged steel bodies to stand pulling and bending strains.
Both Taps and Collars available for right or left hand operation, with or without water-tight threads, and in overlapping sizes of pipe, tool joint and hole diameters. Lip or saw-tooth guides, as desired. Just call your nearest Bowen Service Store—day or night!
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San Joaquin Valley

Lytle Redrilling Eocene Wildcat

Robert S. Lytle, Operator's wildcat well No. 68-28F, on sec. 28, 20s-16e in the Guijarral Hills area, is setting a whipstock near 8875 ft. to redrill for a test of Eocene sands which showed some oil in the original drilling. Located off the southeasterly tip of the Coalinga Eocene Pool, the well bottomed in Cretaceous at 11,586 ft. without finding showings other than 20 ft. of moderate saturation in the upper Eocene at 9420 ft.

The redrill was occasioned when the operator was unable to enter a stub 7 in. liner which was cemented on a plug at 9480 ft. for further trial of the zone before finishing operations. Tests of the interval on the way down were mechanically poor and considered inconclusive.

A mile nearer the field, in the northeast corner of section 29, Standard Oil Co. is building rig for well 82-29F to seek production believed to lie between the Coalinga pool and North Kettleman Dome some six miles to the southeast.

Drilling Continues In Belridge Fields

Shallow drilling for heavy production in the South Belridge field continues a specific program designed ultimately to put down enough wells to properly drain the 1700 acres in this rich area. Predicated on a one well to five acre basis, it will require in excess of 340 wells to accomplish the desired production of the heavy crude currently in fever-pitched demand. At present only 230 wells produce in the district and the current rate of development is a mere token of intent when compared to the drilling yet required.

General Petroleum Corp.'s latest completion was Belridge No. 3-24 which finished at 1055 ft. pumping 74 bbls. of 15.6 gravity oil cutting 6% while its 3-26 is completing at 1098 ft. The company is drilling Mariana No. 3-62 in grass roots and is grading for No. 3-67. Preparing to get under way is Union Oil Co. with four projects staked for the drill. Belridge Oil Co.'s program continues with No. 27A-33 turning to the right at 680 ft. while rig is being built for No. 45A-33.

In North Belridge Tide Water Assoc. Oil Co.'s well No. 35, sec. 21, 27s-20e, is perforating and testing through blank 5 in. liner after bottoming at 8570 ft. and plugging at 8497 ft. Best results are expected from the "R" zone below 8047 ft.

Belridge Oil Co.'s "Y" zone deep well, 27-Y-27 in sec. 27, 27s-20e, is under way after cementing 16 in. surface casing at 805 ft. The company's "R" zone project, 13-R-28 on the adjacent section 28, is also drilling after cementing 11¾ in. casing at 2045 ft.

Pixley Area "Cat" Scheduled Deep Try

Continental Oil Co.'s Reynolds No. 1 is drilling at 3275 ft. after cementing 10¾ in. surface pipe at 496 ft. Located a little more than a quarter of a mile southeast of the north quarter corner of sec. 15, 23s-25e, in the Pixley area of Tulare county, the well is scheduled to test to 7500 ft., unless of course, substantial production is found at less depth. Evidence that the company believes saturation exists in the area

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Guijarral Hills	Lytle, Robt. S., Opr., Well	68-28F	28,20-16	11,586	Redrilling
	Standard Oil Co., Well	82-29F	29-20-16		Building Rig
Helm	Amerada Pet. Corp., Clover	75-34	34, 16-17	8223	Swabbing
Jacalitos	Wilshire Annex Oil Co.	58-26E	26,21s-13e	1318	Drilling
	The Texas Co., Ferguson	1	32, 21-16		Prep. to Spud
Kerman	Richfield Oil Corp., Burns	1	30-13-17		Location
Mendota	Pure Oil Co., C.L.G.	1	22, 15-13	4842	Drilling
Raisin City	Shell Oil Co., Inc. S.A.&F.L.	53-19	19-15-18		Rigging Up
Riverdale	Amerada Pet. Corp., Brum	58-15	15, 17-19	6844	Drilling
	Amerada Pet. Corp., Young	4-15	15, 17-19		Rigging Up
	Amerada Pet. Corp, Courtney	4-23	23, 17-19	609	Drilling
	Amerada Pet. Corp., Jensen	52-26	26-17-19	6840	Completing
	Amerada Pet. Corp., Lawton	58-26	26, 17-19	11990	Abandoned
	Kern County				
Antelope Hills	Shell Oil Co., Inc., Williams	23-6	6, 28-20		Foundation
South Belridge	E. A. Parkford, Well	3	12-29-21	1102	Drilling
Comanche Point	L. E. Barat Synd., Ham Johns	1	5,11-18	1604	Idle
Devils Den	Moran, Robt. B., Opr., Beer	1	19,26-19	1599	Abandoned
Dyer Creek	Fred Jasper, Jr., Well	1	16, 26-27		Location
Edison	M.T.M. Oil Co., Inc., Well	1	23, 30-30		Location
Grapevine	Reserve Oil & Gas Co., Tejon	33-6	33, 11-19	4640	Abandoned
Kern Front	Standard Oil Co., Well	42-9	9, 28-27	6211	Completing
McKittrick	Americal Pet. Inc., Americal	1	2, 30-21	5450	Reaming
McKittrick Front	Westates Pet. Corp., Kimball	3	32, 29-22	1670	Skidding Rig
Midway-NW.	C.C.M.O. Co., Thomas	1	1, 31-21		Grade
	C.C.M.O. Co., Well	24-1	1, 32-22		Rigging Up
Midway-SE.	The Texas Co., P.U.P.	2	33, 11-23	3017	Fishing D. P.
Mt. Poso	Delaney, Fred G., Well	1	12, 27-27		Location
Paloma	Gen. Pet. Corp., Benco	87-28	33, 31-26	10,149	Location
Paloma	Gen. Pet. Corp., Gallagher	61-33	33, 31-26	9231	Drilling
	West'n. Gulf Oil Co., L.A.C.	36-1	1, 32-26		Foundation
Poso Creek	Dolley & Dugan, Sesnon	1	17, 28-27		Location
Shale Hills	Tideland Oil Co., Grant Est.	1	4, 27-28	4064	Idle
	Kings County				
Alpaugh	Elmer C. vonGlahn, Well	1	4, 23-22	7130	Drilling
Pyramid Hills	Miesse, Richard S., Jackie	1	22, 24-17	512	Abandoned
	Pac. O. & G. Dev., West Slope	2	20, 24-18		Location
	Tulare County				
Pixley	Continental Oil Co., Reynolds	1	15, 23-25	3275	Drilling
Tulare	Richfield Oil Corp., Churchill	1	35, 20-24	5566	Abandoned

is found in the fact that early in the year it abandoned Pixley Comm. No. 1 only a mile and a half northwest of the current try. This well prospected to 7906 ft. encountering basement rocks at 7891 ft.

Richfield Starts McKittrick Well

Richfield Oil Corp. is preparing to drill at the north tip of the McKittrick field in Kern county. The project will be Lukas-Ninkovitch No. 1 and is located some 800 ft. north and 2270 ft. east of the southwest corner of sec. 11, 30s-21e.

Americal Pet., Inc.'s outpost well No. 1, in sec. 2, 30s-21e, is reaming to condition hole after recovering a drill pipe fish from bottom at 5450 ft. Originally drilled and abandoned at 1530 ft. by F. E. Fairfield, the well was assumed and deepened by Americal, and is reported to have entered tight oil sand with streaks of shale at 5144 ft.

In the McKittrick Front area Westates Pet. Corp. struck core barrel on bottom at 1670 ft. in Kimball No. 3 and is preparing to skid rig to an adjacent site on sec. 32, 29s-22e.

Western Gulf Starts New Fruitvale Well

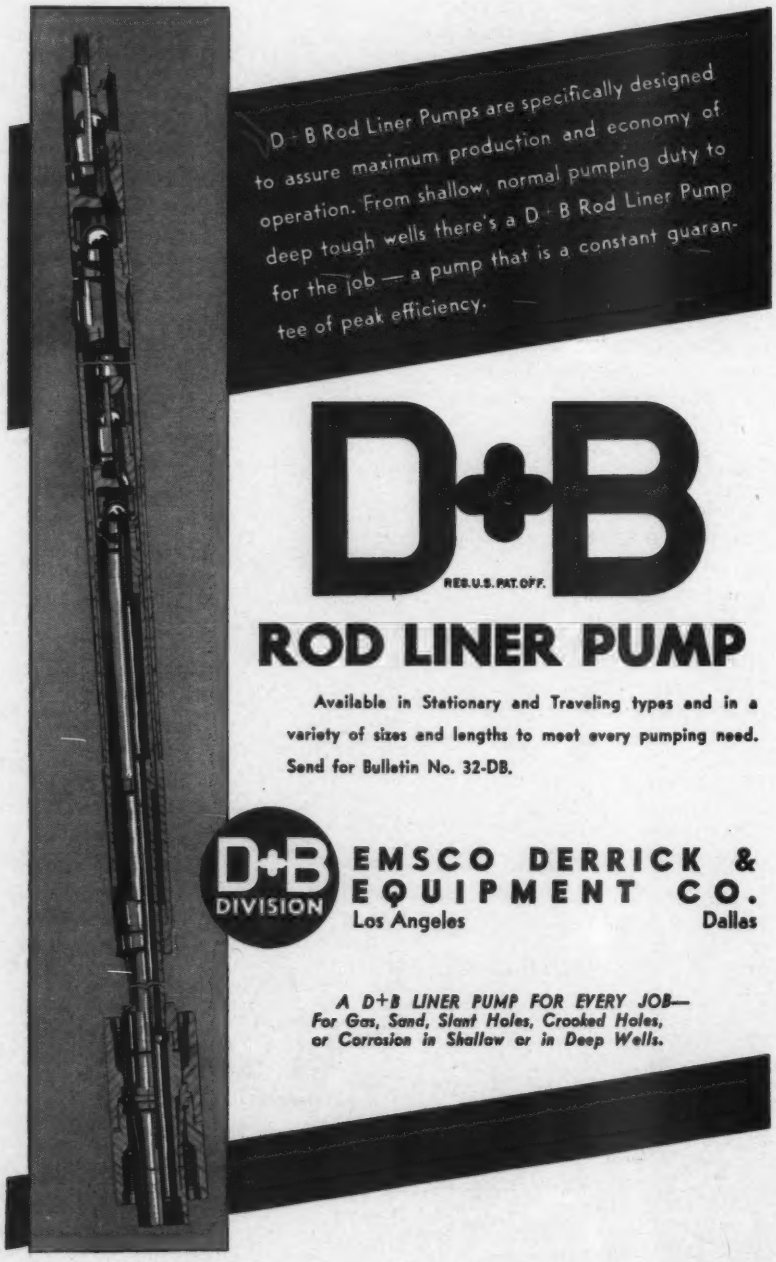
Western Gulf Oil Co. staked location for Red Ribbon Ranch No. 13 on sec. 27, 29s-27e, in the Fruitvale field, as the first of an approximate 14 required to complete adequate development of the heavy oil producing area. To further stimulate its production in the field the company is redrilling KCL No. B-38 and is preparing to work over Sweitzer No. 1. Other operators are reported planning remedial operations.

Dyer Creek Vedder Production Sought

Fred Jasper, Jr., is preparing to drill near the west quarter corner of sec. 16, 26-27 in the Dyer Creek-Richgrove area of Kern county. Objective in the shallow wildcat is the Vedder zone, often drilled for in the general area but found in a productive fault block only recently when Shell Oil Co., Inc., completed Smith No. 56-X-11 pumping 235 bbls. of 15.3 gravity oil cutting 20% from 2361 ft. some three miles to the northeast. Bottomed in Vedder oil sand, the Shell well topped the horizon at 2343 ft. for the successful operation in September of last year. Little drilling has been done in the immediate vicinity of the current try.

Amerada Quits On Riverdale Deep Try

Amerada Pet. Corp.'s deep test at the south flank of the Riverdale field in Fresno county is abandoned at 11,990 ft. in steeply dipping slate. Located near the south quarter corner of sec. 26, 17s-19e, the well found the normal producing middle Miocene sands barren and carried on to


D-B Rod Liner Pumps are specifically designed to assure maximum production and economy of operation. From shallow, normal pumping duty to deep tough wells there's a D-B Rod Liner Pump for the job — a pump that is a constant guarantee of peak efficiency.
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Cretaceous age at approximately 8150 ft. The slate formation was entered at 11,790 ft.

Amerada, discoverer and sole operator in the field, is currently running four projects in the area. On sec. 15, 17s-19e Brum No. 58-15 plugged from 6840 to 6780 ft., where liner including 31 ft. of perforation was landed, and is swabbing after a barefoot test flowed 56 bbls. of clean 37.8 gravity oil and 107,000 cu. ft. of gas through a 9/64 in. bean. Also in the section is Young No. 4-15 currently preparing to spud. On near by section 23, Courtney No. 4-23 is drilling at shallow depth after cementing surface casing, while in section 26, Jensen No. 52-26 is being completed from 6840 ft.

Parkford Develops New Heavy Oil Pool

Three quarters of a mile southeast of the southerly tip of the South Belridge field, E. A. Parkford is continuing development of the small heavy oil accumulation which he discovered early in the year. The discovery well No. 1 was drilled near the west quarter corner of sec. 12, 29s-21e and was completed from 1104 ft. pumping 12.5 gravity oil cutting 45% sand at a 75 bbl. daily net rate. The operator recently moved to the center of the section and finished No. 2 at 1097 ft. pumpin 71 bbls. of 13.8 gravity oil cutting 19% sand. On an adjacent site Well No. 3 bottomed in oil sand at 1102 ft. and is testing water shut off on 8⅝ in. casing cemented at 925 ft. Location for well No. 4 has been staked 233 ft. south and 1232 ft. east of the center of the section.

The pool missed discovery in 1938 when Dorothy Taylor, Ltd., drilled F. K. Land No. 1 only 425 ft. west of the discovery well and abandoned at 1259 ft. without testing poor oil sands cored from 990 to 1120 ft.

SLOW DOWN—Motorists could get approximately 6,300 extra miles out of their tires if they would reduce speed by ten miles per hour.

Sperry-Sun Promotes Dwight C. Roberts

Dwight C. Roberts, regional manager of the Houston office of Sperry-Sun Well Surveying Co., has been

Dwight C. Roberts

promoted to assistant general manager. Mr. Roberts remains in the Houston office and assumed his new duties as of August 1, 1942.

Tool Holder Speeds Lathe Output

A simple and rugged engine lathe tool holder that cuts tool changing time to approximately five seconds and greatly reduces operating time has been developed by the Lane-Wells Co., Engineers and Manufacturers, Los Angeles, California.

Known as the Lane-Wells Universal Tool Holder, the device consists of a tool post which can be fitted on to any engine lathe carriage compound rest. Into a cylindrical member, clamped into the tool post, fit the detachable heads. Standard high speed tool bits used for boring, turning, threading, facing or forming are fastened into the heads and each bit remains in place in the head. Drills and reamers can also be used.

In practice the lathe operator has several heads each carrying a tool to perform a certain operation on the stock. The first head is placed in the tool holder and locked in place by a quarter-turn of the control handle. As soon as the operation on the stock is performed by the first tool, the operator releases the head, replaces it with the second head, locks it in place and is ready for the next operation. The change requires approximately five seconds. After sizes are once established all readings can be taken from the cross feed dials.

If a particular tool must be removed and then reinserted in the toolholder, as for example when a particular working operation is interrupted by other work to be done, the Universal Tool Holder permits the original tool to be reinserted in the tool holder in exactly the same position it originally occupied. Work can then be resumed without the necessity of resetting the position of the tool holder relative to the work. The ordinary engine lathe, equipped with the Universal Tool Holder and a supply of detachable heads, makes possible any number of operations. The one tool holder will perform either outside turning or boring operations.

In actual practice during the past year in the Lane-Wells plant, in the manufacture of oil well supply parts, the Universal Tool Holder made possible a reduction of 35% in machining time on many operations.

Four sizes of the device fit all standard makes of engine lathes from 10 inch to 24 inch.

Complete details and specifications are available from Lane-Wells Co., 5610 South Soto Street, Los Angeles, California.

Lane-Wells Universal Tool Holder cuts engine lathe tool changing time to approximately five seconds. Standard high speed tool bits are fastened in detachable heads to speed boring, turning, threading, facing, forming drilling or reaming operations.

Coastal District

Conoco to Redrill Piru Area Project

Continental Oil Co. is preparing to redrill Holser No. 1 on the Ramona anticline in section 14, 4n-18w, approximately 3½ miles southeast of the shallow Piru field. It will attempt to secure more highly saturated sand in a whipstocked position.

Bottomed in steeply dipping shale with streaks of gray sand at 5228 feet, the hole was plugged to 4663 feet and went on the pump for 100 barrels of 27 gravity oil, cutting 52.9 per cent. The decision to seek better formation was reached when production declined while the cut increased.

Ventura Avenue Work Proceeds

Shell Oil Co., Inc., General Pet. Corp. and Tide Water Assoc. Oil Co. are preparing a joint proposal for Ventura Avenue development which seeks permission to take in all zones in each well on a one well to 40 acre basis. It is believed that due to the characteristics of the formations in this area, adequate drainage will be afforded so that all zones may be produced with minimum steel consumption.

Currently working in the field is Shell Oil Co.'s Taylor 146, drilling at 6524 feet and No. 155 making hole at 2705 feet. Scheduled for an immediate start is Taylor No. 156 as an extension well at the northwest flank of the field.

At the north edge of the field Alliance Pet. Corp. Hisey No. 5 is coring ahead at 10,533 feet while Lloyd Corp.'s well No. 1 is coring oil sand and shale at 11,375 feet.

Texaco Starting Gas Development

In the hope of uncovering further gas production in Northern California, The Texas Co. is scheduling the drilling of three new wells in scattered portions of Northern California. Such production is needed since all future demand for gas in the Metropolian Bay area must be met with gas produced in the north, due to the fact that the line from Kettleman Hills, which previously transported gas to the area, has been diverted to crude oil transportation.

The first of the projects is Holmes-Eureka No. 2, for which a portable mast is erected on sec. 22, 3n-1w, in the Eureka area of Humboldt county. The company's first well in this same section, Holmes-Eureka No. 1, was completed in 1940 at a depth of 4850 ft. and produced 5,200,000 cubic ft. of gas through a

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
	Santa Barbara County				
Cat Canyon	Alphonzo E. Bell Corp., Gilmore	1	23, 9-33	6457	Idle
	Standard Oil Co.	SBLC1	15-9-33	2530	Drilling
	Standard Oil Co., Los Flores	5	33, 9-33		Rig
Lompoc	Alphonzo E. Bell Corp.. Lompoc	6	28, 8-34		Graded roads
	Fickert Oil Co., Ltd., Well	1	8, 7-33		Rig
Los Olivos	Tide Water Assoc O. Co., Davis	1	33, 8-31	5055	Drilling
Orcutt	Standard Oil Co., Rice Ranch	1	14, 9-34	8740	Drilling
	Ventura County				
Bardsdale	Hopland Oil Co., Well	1	1, 3-19	4634	Idle
	Santa Marino Oil Co., Elkins	1	7, 3-19		Grade
	Ventura Southern Oil Co.	G-1	19, 3-19	5001	Drilling
Conejo	Sycamore Oil Co., Boylan	1	23, 1-20	2801	Drilling
	L. A. Basin Oil Co., Well	1	4-1-20	1380	Drilling
Eureka Canyon	Phillips & Nichols, Well	2	33, 4-18	667	Rn. Cas.
Ojai	Coates, Spencer D., Pirie	5	7, 4-22	916	Drilling
	Kelalee Pet. Co., Harvey	1	8, 4-21		Rig
	Richfield Oil Corp., Ojai	44	13, 4-22	5111	Pumping
Oxnard	Royalty Service Corp., Leonard	1	19-2-22		Prep. to Spud
Piru	Continental Oil Co., Holser	1	14, 4-18	4663	Prep. Redrl.
	Delroy Pet. Corp., Fisk C. H.	1	22, 5-18	2629	Repairing
	Pacific Western Oil Co., Temescal	13	4, 4-18	2123	Drilling
Red Mountain	Shell Oil Co., Inc., Wood	1	7, 3-23	5754	Abandoned
Timber Canyon	Crude Oils., Inc., West	1	19, 4-20	958	Idle
	Denison, A. T., Denison	1	13, 4-21	1625	Completed
	Henderson-Ortez Oil Co., O'Leary	1	29, 4-20		Rig
Torrey Canyon	Union Oil Co., Torrey	60	5, 3-18		Location

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Colusa	Pacific National Pet. Corp.	1	17,17n-4w	1402	Idle
Contra Costa	Joseph Faria, Jr.	1	21-2n-1w		Partly rig'd up
Humboldt	The Texas Co., Holmes-Eureka	2	22-3n-1w		Portable Mast
Madera	Blake, T. E., Chuck	1	28, 10s-17e		Partly rig'd up
Merced	T.W.A.-Seaboard Oil Co.'s Turlock Land	37-18	18, 6s-11e	6505	Abandoned
Monterey	Loma Grande Oil Co., Corey	1	23,24s-10e	4318	Standing
	Wm. C. Jensen, Vierra	1	7-13s-2e		Rig
Sacramento	Standard Oil Co., Tersehuron	1	27, 4n-3e	3910	Completed
San Benito	The Texas Co., Henderson	1	33, 16s-12e		Rigging Up
	Union Oil Co., Friedman	1	13, 16s-12e		Rigging Up
San Joaquin	Standard Oil Co., Blewett Com.	3	23, 3s-6e		Rig
San Joaquin	Standard Oil Co. Woods Comm.	1	23, 1n-5e	4790	Drilling
Solano	Standard Oil Co., Suisun Com.	2-1	25, 3n-1w	7300	Cementing
Stanislaus	Don Pedro Oil Co., Newman	1	9, 6s-9e	4074	Idle
Sutter	Buttes Oilfields Inc., Buttes	8	28, 16n-2e	5561	Idle

30/64 inch bean under 1434 flow pressure. The present try is situated to the east and expects to find the gas sands possessing more thickness and permeability.

A second effort is being made on the Chowchilla Farms lease in Madera county, in an attempt to uncover deposits similar to those in the Chowchilla Gas Field, where non-marine Middle Miocene and Cretaceous strata have yielded gas production.

The drilling is to be done exclusively by the Texas Co., in return for which the Pure Oil Co., original lease holder, has agreed to assign fifty per cent of its holdings. The third project is a Cretaceous gas test on the Walbridge Estate in the Tuscan Buttes area, approximately 20 miles southeast of Red Bluff in Tehama County.

Denison Completes Timber Canyon Well

A. T. Denison's Ventura county wildcat, Denison No. 1, in sec-13, 4n-21w on the north flank of the Timber Canyon field, approximately four miles northeast of the town of Santa Paula, has found production to the tune of 14 barrels a day of 37 gravity oil cutting 2.4 per cent. With 6⅝" casing cemented at 1450 ft. including 700 ft. of perforations, and 2½" tbg. at 1403 ft., the well was placed on the pump to produce Miocene sands encountered at 1125 ft.

T.W.A.-Seaboard Quit Merced County Wildcat

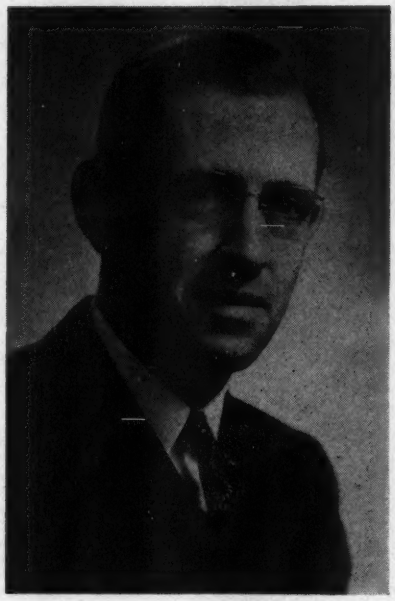
Tide Water Assoc. Oil Co.-Seaboard Oil Co.'s Turlock Land Co. No. 37-18, in sec. 18, 6s-11e of Merced county, was abandoned in Green sand at a plugged depth of 3630 ft. after Cretaceous sands proved unproductive at 6505 ft. A formation test with packer at 3478 ft, open 42 min., recovered 3450 ft. of mud and water. A previous test of the interval 3545-4013 ft. open for 17 minutes, recovered 3000 ft. of mud, with no traces of oil or gas.

Rincon Deep Try Coring Gray Sand

C. C. M. O. Co.'s deep test, No. C-10, in sec. 17, 3-24 of the Rincon field, is in wet looking gray sand with streaks of shale showing 39 degree dips at 10,065 ft. The well correlates approximately 180 ft. lower than No. C-3, a prior deep try which proved non-commercial. Fair looking oil sand was cored from 9716 to 9788 ft.

General Electric Promotes Corlett

General Electric has recently advanced J. A. (Jack) Corlett to the position of Pacific District Publicity Representative.



J. A. Corlett

Stationed in Los Angeles for some twelve years, his headquarters will now be in San Francisco. In his work of collecting, preparing and disseminating information on the application and performance of General Electric apparatus (machinery) lines, his field of operation will now include the states of California, Arizona, and most of Nevada. He will be assisted in Southern California and Arizona by A. X. Schilling who will headquarter in Los Angeles.

Mr. Corlett graduated from the University of Nebraska in 1923 as an electrical engineer. Since that time he has filled numerous engineering, sales and publicity posts in General Electric.

Nomad's Wing-Ding

Nearly two hundred Nomads and their guests enjoyed the annual Wing-Ding of the Los Angeles Chapter of Nomads held at the Cheviot Hills Country Club, Los Angeles, during the entire day and evening of July 24th. Starting off with a golf tournament in the morning and afternoon, games of skill were then played until dinner was served shortly after eight o'clock. After the dinner, golf, gaming and door prizes were awarded. The tables were then removed and chairs arranged around the hall to supply good seats for everyone to see the girl show which climaxed the entertainment.

A silver cup was awarded for the low gross golf score and was captured by A. K. Smith of Western Gulf Oil Company. Six blind bogey prizes were to be given but two will have to be awarded later because of a tie. Those receiving their prizes were Fred Currie of Timkin Steel and Tube Division, Jim Creed of Halliburton Oil Well Cementing Company, Ralph Porter of Standard Oil Company of California, and F. A. Driskill of the Iraq Petroleum Company. Herb White of Republic Supply Company, Paul Huggins of Western Gulf Oil Company and George Trembley of Howard Supply Company will play off the tie for the two other prizes.

All prizes except those for golf were war bonds and stamps. Those winning bonds for their "skill" in the games played before dinner were Paul Cavins, a $50.00 bond; Jud Saatjian of the Texas Company, a $25.00 bond; and Bob Eiche, a $25.00 bond. The first door prize of a $25.00 bond went to Bill McGuirk of Eason-Therolf Tool Company. Ted Sutter of Baker Oil Tools, Inc., won $10.00 in stamps as did Ray

(Continued on Page 30)

Nomad's

Above, right to left, Ray Dearman, George Trembley, Al Smith, and Les Hales. Center, Ralph Cutler, Frank Scott, Bill Grant, and Bill McGraw. Below, E. Morris Smith, H. G. Arnold and Don Beeson. Bottom of page, Edwin Ross, Dutch Brown, Tommy Renfro, and Hans Ross.

Wing-Ding

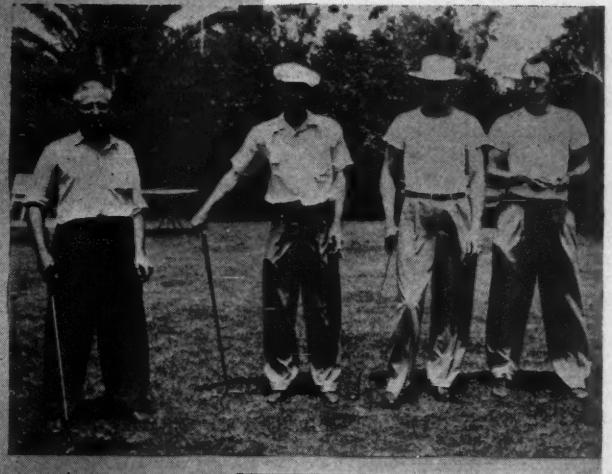
Above, left to right, R. A. Porter, Stanley Doucette, Bob Eiche, and Dr. Paul McWilliams. Below, Ernie Fowks, R. Weton Whann, Paul Cavins, and Waldo Moore. Bottom of page, Lou Bronzan, Inky Wotkyns, Frank Bergeron, and Luke Johnson.

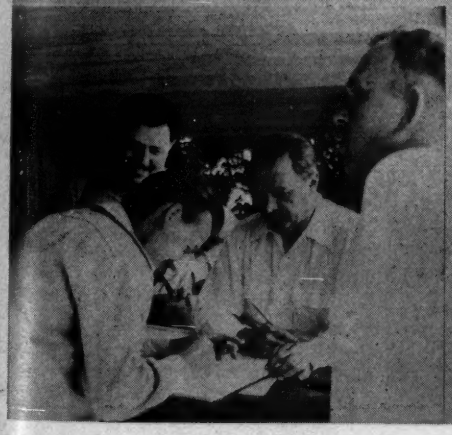
Nomad's

Above, left to right, Fred Currie, Tom Heavener, Lee Laird, Herb White, and Paul Daniel. Center, Pete Maxfield, M. O. Johnston, Hank Paulsen, Ernie Adams, and Paul Huggins. Below, Wally Rushing, Walter Greenfield, and C. S. Perkins. Belower yet is ye golf committee explaining to prexy.

Wing-Ding

Above, left to right, Earl Bougus, Dick Wipperman, Franklin Houston, and Dean Sheldon. Below, Abe Haglund, E. E. Wood, Bill Goertz, and J. O. Hills. Bottom of the page, Bill Bettis, K. S. Ferrer, H. F. (Foy) Schlittler, and George Anderson.





(Continued from Page 27)

Love of Tidewater-Associated Oil Company. The winners of another $25.00 bond and three more $10.00 stamp prizes failed to give their names so their identity remains unknown.

Credit for the great success of the Nomads Wing-Ding goes to the committee which consisted of Roland Smith of Grant Oil Tools, chairman; Tom Murphy of Martin-Decker Corporation, who got into the army before the party and could not enjoy the fruits of his labors; Jim Robinson of Miller-Robinson; George Trembley of Howard Supply Company; and Bob Eiche, foreign tool representative. George Trembley and Bob Eiche were in charge of the golf tournament.

The next meeting of the Los Angeles Chapter of Nomads will be a barbecue to be held during the middle of September. Details of this are now being arranged.

Oil Well Supply Co. Makes Export Change

Effective August 1, 1942, M. E. Nicklin, Manager of the Export Division, Oil Well Supply Co., 30 Rockefeller Plaza, New York City, will have his office at the manufacturing headquarters of the company at Oil City, Penn.

Mr. Nicklin will continue as Manager of the Export Division, dividing his time between New York and Oil City offices, thus bringing about a closer liaison between production and the export trade.

R. H. McPeake, Sales Manager of the Oil Well Supply Co., Export Division, will continue his headquarters in New York City and will be in charge of the New York Office when Mr. Nicklin is out of the city.

G-E Industrial Control Switches

A new four-page bulletin illustrating and describing improved G-E circuit control switches for industrial applications, has been announced by the accessory equipment section of General Electric Co.'s appliance and merchandise department at Bridgeport, Conn. Switches shown in the bulletin are for use in signalling equipment, communication apparatus, instrument panel boards, utility lighting systems, specialized lighting equipment, aircraft circuit control systems, etc.

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The bulletin shows 26 toggle and push button switches. Toggle switches include single pole, double pole, three way (single pole, double throw), double pole-double throw, two-line-two-circuit, and three point. Many of the switches are made to Navy specifications.

Wiring diagrams of all switches, and specifications of assembly parts are given. Copies of the bulletin are available on request from your nearest General Electric distributor.

Reserve May Drill New Grapevine Well

Reserve Oil & Gas Co. is checking geology and structure in the Grapevine area with the intent to locate a new try which may find better oil saturation than was found in original field drilling. It has long been contended that the first production in the pool was an edge condition and could be bettered by subsequent search. The company recently demonstrated a change of sand phase when it drilled and abandoned its easterly outpost, Tejon No. 33-6, near the east quarter corner of sec. 33, 11n-19w. Bottomed at 4640 ft., this well entered a sand zone at 4480 ft. which showed better porosity and permeability than that in the original pool but unfortunately only the upper 30 ft. showed fair cuts. The balance to bottom was definitely wet and prompted abandonment and consideration of another location.

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FOR SALE

DEPARTMENT OF THE INTERIOR, U. S. Land Office, Sacramento, California.—Notice is hereby given that a lease of the oil and gas deposits in the following described lands is offered to the responsible qualified bidder of the highest bonus per acre, pursuant to the provisions of section 17 of the act of February 25, 1920 (41 Stat. 437), as amended, at the royalty rate scale in the lease form shown in General Land Office Circular 1386, at a sale to be held in the office of the Register of the District Land Office in Sacramento, California, at 10 o'clock A.M., on September 10, 1942, E½ SE¼ Sec. 2, T. 21 S., R. 14 E., M.D.M. California, containing 80 acres in the Coalinga West Side oil and gas field. The successful bidder must deposit on the date of the sale a certified check on a solvent bank, or cash, for 1/5 of the amount of each bid, and file a showing of qualifications to receive the lease required by section 7 of Circular 1386. The remaining 4/5, together with the annual rental in advance at the rate of $1 per acre, must be paid and a $5,000 corporate surety bond must be furnished prior to the issuance of the lease. The bidders are warned against violation of the provisions of section 59 of the U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids at the discretion of the Secretary of the Interior. Register. 9/5b

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122 ft. Parkersburg Steel Derrick.
7 Low Pressure Parkersburg Gas Traps with fittings.
2 High Pressure Parkersburg Gas Traps with fittings.
1 International P-300 Motor.
Two—1000 bbls. API bolted tanks.
Approx. 14,000 ft. 2½ inch API Upset 8-thread round tbg.
750 ft. 6⅝ inch 26 lb. casing.
500 ft. 7 inch O.D. 24 lb. casing.
4000 ft. ⅞ inch Axelson sucker rods.
3000 ft. ¾ inch Axelson sucker rods.
All above are located at West Dominguez field. For further information, address John D. McIntyre, Trustee, 4170 5th Ave., L. A. 8/5b.